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ABSTRACT

After presenting the background of the availability of fuel for transportation and the increasing per capita energy consumption, the report examines the State's role in energy conservation. Five proposals are outlined: (1) a coordinated education program designed to increase public awareness of the current energy situation; (2) a pilot program of measuring fuel savings that might be realized through the use of radial tires in the State motor vehicle fleet; (3) a redirection of State employee travel habits and patterns; (4) a determination of whether the provision of high speed rail service operating in the Albany to New York City corridor would contribute to fuel conservation; and (5) the establishment of a closed-circuit telecommunications system between New York City and Albany as a one-year pilot program to conserve energy by reducing the number of automobile trips between these cities. (Author/MLF)

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Report Of

Ad Hoc Committee

on

# Energy Efficiency in Transportation

to the

Interdepartmental Fuel and Energy Committee

of the

State of New York

October 31, 1973

Albany, New York

EA 005 918

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# PREFACE

Early in 1972 Governor Rockefeller appointed an Interdepartmental Fuel and Energy Committee to monitor, on a continuing basis, the fuel and energy resources and requirements of New York State and to recommend action to alleviate both present and potential problems. The Committee recommended to the Governor that New York State embark upon a program of energy conservation. The Interdepartmental Committee Action Plan established three technical industry-governmental ad hoc committees to identify the opportunities for energy conservation in large buildings, appliances, and transportation.

The Chairmanship of the Ad Hoc Committee on Energy Efficiency in Transportation was assigned to the Department of Transportation. Mr. Howard B. Clarkson, Director of the Project Development Bureau was appointed Chairman of the Ad Hoc Committee. The concept behind each ad hoc committee was to bring together representatives of governmental and non-governmental agencies concerned with the various aspects of energy conservation.

The Ad Hoc Committee on Energy Efficiency in Transportation was charged with evaluating various means of increasing efficiency in transportation, including: (1) tax incentives or disincentives; (2) licensing; (3) horsepower limitations, and (4) mass transit. The Ad Hoc Committee first adressed conservation measures which could be implemented early, and then, secondly, turned to actions which would take longer to carry out.

In the first category, five proposals were prepared and transmitted to the Interdepartmental Committee between November 1972 and May 1973. The Ad Hoc Committee also urged favorable consideration to the concept of providing operating assistance to public transit. Those efforts and further deliberations of the Committee have laid the groundwork for this interim report of the Ad Hoc Committee on Energy Efficiency in Transportation.

A description of Committee membership and its deliberations are reported in further detail in Appendix A1.

# I. SUMMARY AND RECOMMENDATIONS

## Summary

The Ad Hoc Committee on Energy Efficiency in Transportation was formed in September 1972 as an outgrowth of the activities of the Governor's Interdepartmental Fuel and Energy Committee. The Ad Hoc Committee was instructed by the parent Interdepartmental Committee to report on short-term recommendations for improved efficiency in transportation energy use, and then continue its work to identify longer-range programs. This report is in response to the charge originally given to the Ad Hoc Committee.

Throughout the Ad Hoc Committee's deliberations several things became apparent:

(1) Long-range estimates of energy supply and demand are subject to much uncertainity;

(2) the increasing inability to meet energy demands is not unique to New York State but affects the nation and the industrialized world as well;

(3) individual states are limited in the possible activities which they can undertake to effect energy conservation--unified multi-state and federal actions hold the most promise for yielding meaningful results;

(4) methods of ameliorating the effects of shortages in energy supplies span a very broad range of possible activities from those which are acceptable and easily implemented to those which would be extremely unpopular and difficult to implement;

(5) controversy is inherent in the energy issue because certain environmental and economic goals conflict with the conservation of energy resources;

(6) a major re-education of the public will be required to develop the attitudes necessary to permit significant reductions in transportation energy consumption; and

(7) energy conservation measures relating to the automobile and its use offer the greatest potential to effect significant energy savings in the transportation sector.

Far-reaching questions which the Committee did not undertake to answer included the validity of information about prospective energy supplies and demands, the possibility of research breakthroughs which could have either beneficial or detrimental effects upon the energy situation, the possibility of a significant new discovery of energy resources, and the financial impact of increasing oil imports on the national and world economic situation.

The Committee found, however, that various ideas on conserving energy could be evaluated without answers to those far-reaching questions. Numerous suggestions were analyzed and evaluated in terms of their acceptability to the public, their relative effectiveness in conserving fuel, and their likelihood of success when all factors are considered.

Recommendations

Out of its considerations of the energy situation the Ad Hoc Committee on Energy Efficiency in Transportation has recommended action along five lines.

(1) Vigorous support from New York State at the federal level to assure the development and carrying out of a coordinated and effective national energy policy, which includes the goal of decreasing over-all energy consumption for travel while assuring enough fuel for the most needed transportation services.

(2) Initiating a coordinated education program to make the public aware of the energy situation, and of measures that might alleviate shortages.

(3) Action programs mainly within state government aimed at saving transportation energy by a tire and fuel test, more efficient employee travel, high-speed rail service, and a pilot closed-circuit videophone system to replace travel.

(4) Consideration of several proposals more directly affecting the public at large:

Require an energy efficiency rating (EER) to be placed on all price stickers for new automobiles sold in New York State.

Encourage use of radial tires, and periodic engine tune-ups.

Modify state vehicle registration fee schedules to encourage the growing popularity of smaller automobiles.

Improve fuel efficiency of suburban commuter travel by regional coordinated programs to strengthen or initiate transit service and encourage car pooling.

Reexamine contemporary land use concepts and regulations with a view to reducing transport fuel consumption.

(5) Put the work of the Ad Hoc Committee on a continuing basis, to evaluate the longer-term and more subtle problems of transportation energy consumption, and to monitor the effectiveness of the measures taken to relieve the situation. The New York State Department of Transportation could be designated to carry on this work in cooperation with the Interdepartmental Fuel and Energy Committee. Tasks anticipated at present for this ongoing effort include:

Formulating consistent positions on energy-use aspects of transportation, and coordinating with other agencies having concerns in energy use.

Furnishing the transportation-related inputs to the public education program, and assisting in developing the proposed school curriculum on energy.

Obtaining and analyzing additional technical data, and evaluating other proposals for conserving transportation fuel.

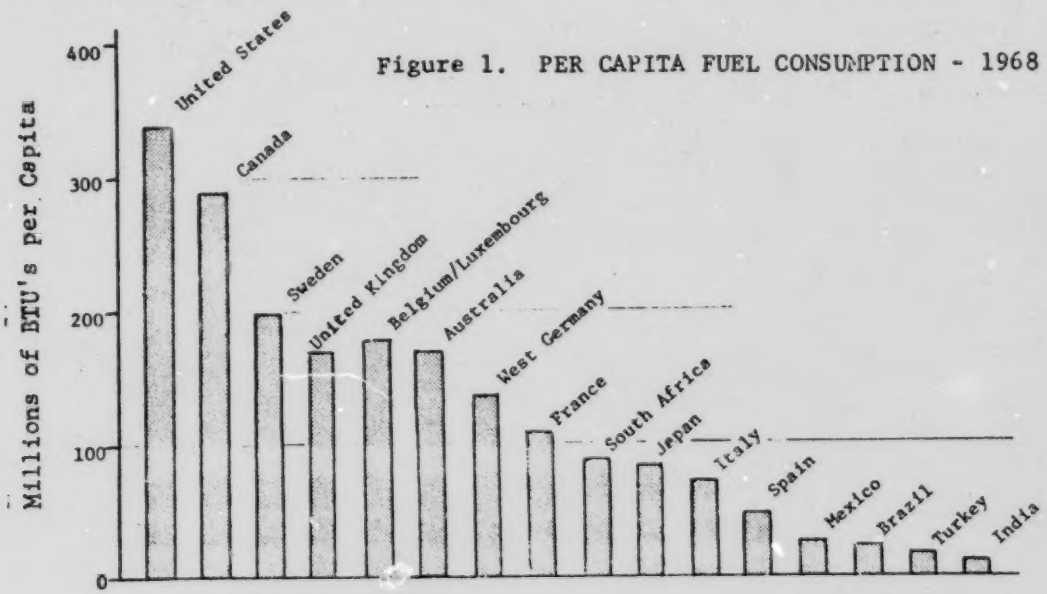
Certain of the recommended actions may be difficult to implement. The key to their acceptance, however, is a public that understands and concurs in the need to conserve fuel. Therefore an ongoing education campaign aimed at getting people to be conscious of the broader energy problem and concerned with the careful use of fuel in their day-to-day living is essential.

The Ad Hoc Committee on Energy Efficiency in Transportation wishes to emphasize that New York State is quite limited in what it can do on its own to accomplish energy conservation in transportation; real success on this front can only be accomplished with all states working in concert with the federal government to bring about national changes in patterns of energy usage.

## II. THE TRANSPORTATION ENERGY PICTURE

Richly endowed with natural resources, this nation has long enjoyed the convenience of abundant supplies of fuel and raw material. On a per capita basis, energy use by our people has attained a conspicuously high level, as shown in Figure 1. To be sure, through the years an occasional skeptic has foreseen a shrinking of the abundance and has counseled its careful use. For the most part such voices have gone unheeded. With truly vast coal resources, and the promise of energy from nuclear processes, the prospect of an energy shortage in the United States has seemed almost incredible.

Figure 1. PER CAPITA FUEL CONSUMPTION - 1968




Source: U.S. Department of the Interior, United States Energy: A Summary Review (Washington: Government Printing Office, 1972), p. 1.

Now, virtually overnight, the nation is aware that it may indeed face an energy crisis. The problem is exceedingly complex, and enmeshed in conflicting views. It is the purpose of this chapter to present a brief account of our energy prospects, with special reference to the particular needs of transportation. Very little energy is actually produced in New York State, but this state is a major consumer of energy. That being so, the energy situation is properly reviewed in a national context, since national policy will govern the energy supply for New York State as well.

## Supply and Demand at the National Level

Viewed simply in terms of the total amount of energy derived from all sources, our national energy demand is -- at present -- approximately in balance with supply. Why, then, is there an energy problem, and how does it affect transportation?

Figure 2
ENERGY CONSUMPTION
BY SECTOR

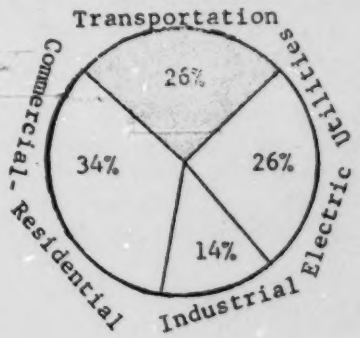
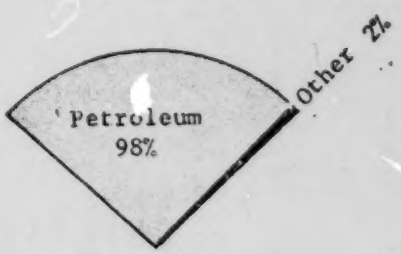



Figure 2 indicates how the total supply of "primary" energy, such as coal and oil, currently is being consumed in the United States. The electric utilities, of course, convert their input of primary energy into electric power that they distribute among the other consuming sectors. Fully one-quarter of the energy supply is consumed by the transportation sector.

Figure 3
TRANSPORTATION DEPENDS
ON OIL



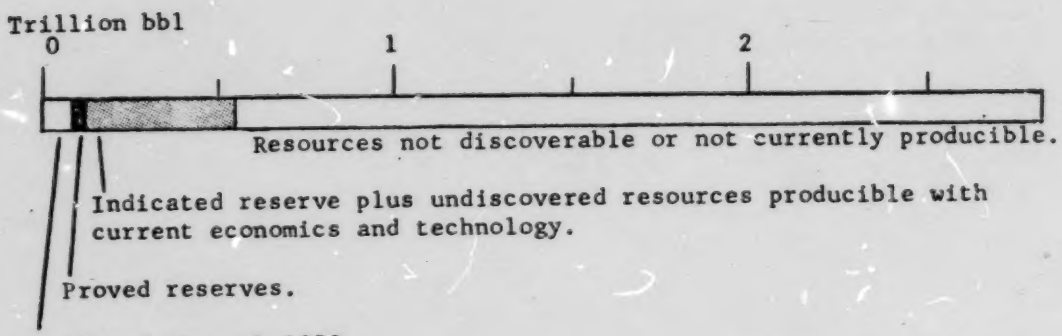

As indicated in Figure 3, transportation is fueled almost exclusively by petroleum which is converted on-board into propulsive power. Currently only a small fraction of total transportation energy is consumed in the form of electricity or pressurized gas, rather than as a liquid petroleum fuel. The virtually complete dependence of U.S.transportation on oil is a matter of great significance in our energy situation. For one thing, a preponderance of existing transportation equipment was designed to operate on petroleum fuels -- and in many cases, on specific types and grades of fuel. Moreover, the quantities consumed are enormous, and the vast system for supplying transportation energy is based on storing and handling fuels in liquid form.

All sources of energy are tied together in the current shortages and uncertainty, because one source may sometimes be substituted for another in stationary applications (like heating) if there are compelling incentives: a dramatic price rise, environmental regulations, or anxiety about an assured supply. Nonetheless, for transportation needs the critical energy source is petroleum, and

the amount that cannot be supplied from domestic reserves is obviously a vital concern.

The domestic petroleum picture is, quite plainly, one of large resources but restricted supplies. Total crude oil resources of the United States, both offshore and on, are estimated as originally some 2.8 trillion barrels.[1] As depicted in Figure 4, the great bulk of those resources is essentially unavailable now. Measured against what has already been extracted our proved reserves are not impressive: The ratio of proved reserves to annual production is now about ten to one. Still, a substantial amount of crude oil beyond present proved reserves may possibly be developed.

Figure 4. U.S. CRUDE OIL RESOURCES




Source: U.S. Department of the Interior, United States Energy: A Summary Review (Washington: Government Printing Office, 1972), p. 27.

1. U. S. Department of the Interior, United States Energy: A Summary Review (Washington: Government Printing Office, 1972), page 27.

In contrast with our potentially sizable petroleum resources, the supply of products actually flowing from domestic reserves is relatively limited. Controversy continues on why those reserves are not being tapped and refined quickly enough to meet the demand -- and, if they were, on how soon rising demand would outrun even that supply. Factors that may be involved include oil industry economics, environmental restrictions, and the yield rate of each oil well. While the Committee is in no position to assess the validity of the various explanations and viewpoints in the controversy, we believe that this is evident: the nation is unable to take full advantage of its domestic crude oil reserves now and probably for many years into the future.

In terms of supply from other sources, we do have -- potentially -- ample energy available from domestic coal reserves, possibly augmented by nuclear processes and oil shale. Our proved coal reserves contain as much energy as the nation would consume in the next half century or more at the current level of total energy consumption. Coal thus could make up the deficit from the predicted slow decline in domestic oil and gas production.

Nonetheless, to picture our energy situation as bountiful would be grossly misleading. Both coal and nuclear energy are subject, quite properly, to serious environmental strictures. Increased use of coal is restrained by its high sulfur content, resulting in air pollution when burned, and by extensive land damage due to strip mining. Nuclear energy is subject to serious misgivings about the disposal of radioactive wastes (long-term storage) and waste heat as well as siting problems (heavy opposition from neighbors of prospective plants). Even if the problems of coal and atomic energy were overcome tomorrow, national energy difficulties would still persist, if only because of the relative unconvertibility of transportation equipment from its dependence on petroleum fuels.

In spite of the difficulties just cited, if our energy consumption rate remained unchanged and our supplies were stable, it might be possible to get along for some time without serious problems. Against this prospect, however, is the fact of the relentless growth in the nation's demand for energy. Figure 5 traces this growth on a per-capita basis. Compounded by the needs of an increasing population, the rapid rise in current and projected total energy consumption is evident in Figure 6. Although this growth when expressed as an annual rate of approximately 4 per cent may seem modest, it is not: it is equivalent to a 50 per cent increase in consumption every 10 years. The implications of an increase of that magnitude each decade extend to the environment, to our balance of payments, and even to the nation's independence in foreign affairs.

Figure 5. PER CAPITA U.S. ENERGY USE

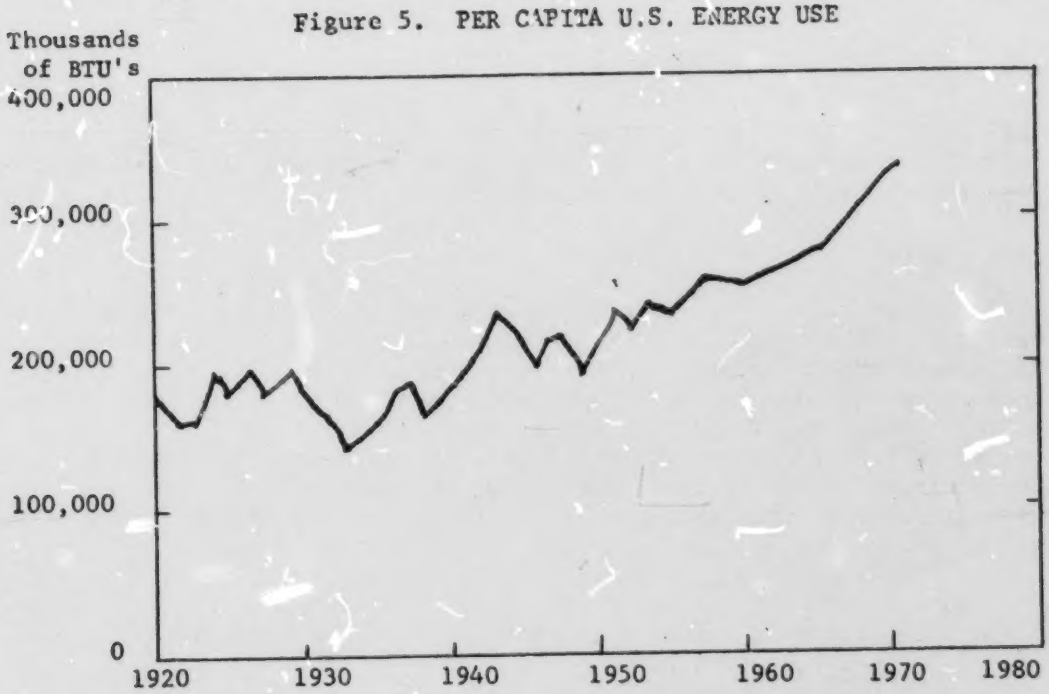
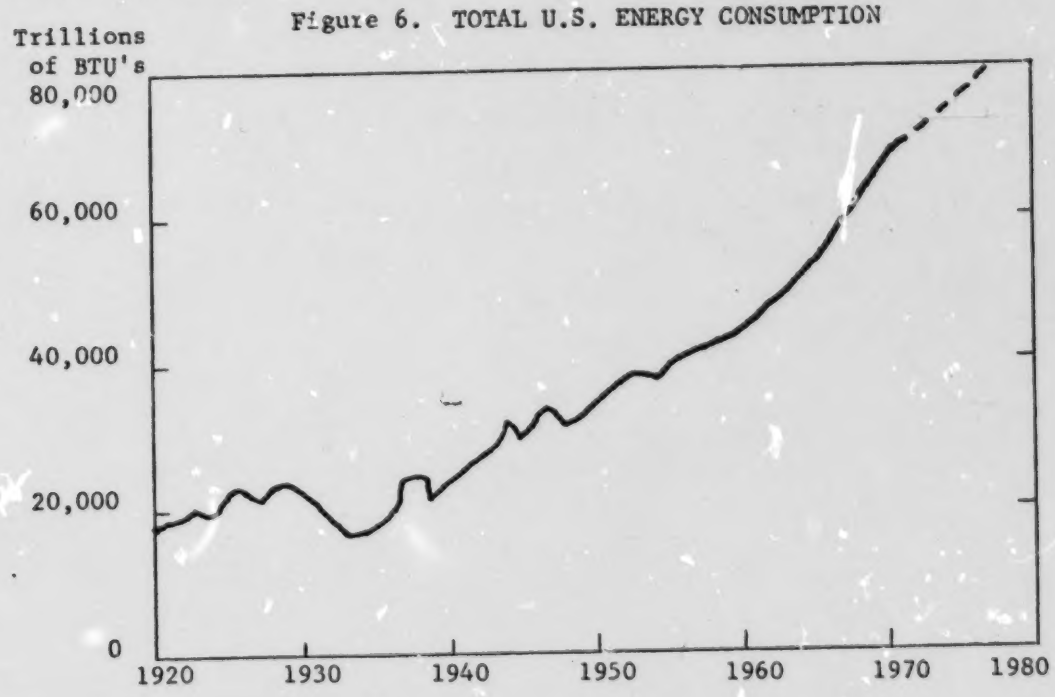



Figure 6. TOTAL U.S. ENERGY CONSUMPTION




Sources: U.S. Bureau of the Census, Statistical Abstract of the United States: 1972, p. 506; The Statistical History of the United States from Colonial Times to the Present (Stamford, Conn.; Fairfield Publishers, Inc., 1966 [?]), pp. 354-55.

This picture of soaring U. S. energy demand is paralleled in the other industrial nations.[2] Given the prospect of an international scramble for fuel, clearly we must consider the future.

The Outlook

While energy demand appears quite predictable for many years ahead, energy supply is much less predictable even in the immediate future. The demand-supply relation in the more distant future (say one generation hence) seems still more uncertain. This uncertainty reflects the possibility that one or more quite unpredictable factors could confound forecasts which are necessarily based on reasonable projections from the recent past. Some examples of the kinds of unpredictable factors that may radically affect matters for better or worse are:

(A) Unexpected discovery of a vast domestic oil reserve quite overshadowing the potential of the North Slope discovery in Alaska.

(B) Incontrovertible evidence of entirely unacceptable danger from nuclear reactors, forcing abandonment of all existing installations and precluding any new ones.

(C) Substantial retreat from national environmental standards.

(D) A sudden upturn or downturn in the rate of increase in energy consumption.

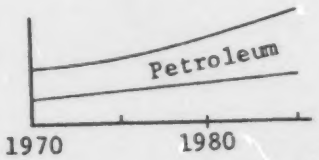
(E) A fundamental breakthrough in safe nuclear energy production.

In light of such possibilities it is difficult to speculate on the energy situation byeond the next dozen years or so. Accordingly let us examine only the mid-term future (say to 1985-90) as projected, aware that even mid-term projections could be altered radically by events of the kind just noted.

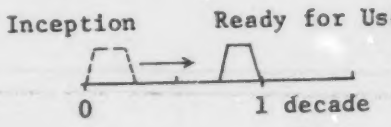
[2] See for example, U. S. Department of the Interior, special reprint Energy for Living (Washington: Government Printing Office, 1972), page 7.

For the mid-term future, there are five salient aspects to be considered:

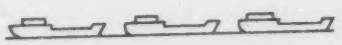
(A) The growing demand for energy -- notably petroleum.



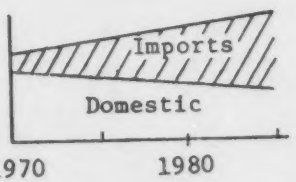

(B) The time lag in developing energy supplies, amounting to a "system inertia" measured in half-decades and full decades.



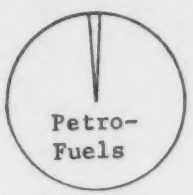

(C) A limited capability for delivering and processing more and more oil and gas.



(D) U.S. dependence on imported petroleum, expected to reach some 50% of our consumption by 1980, and the political instability surrounding many overseas supplies.




(E) Nearly-total commitment of transportation to petro-fuels, with millions of existing engines and fuel systems not readily adaptable even to other petroleum products.

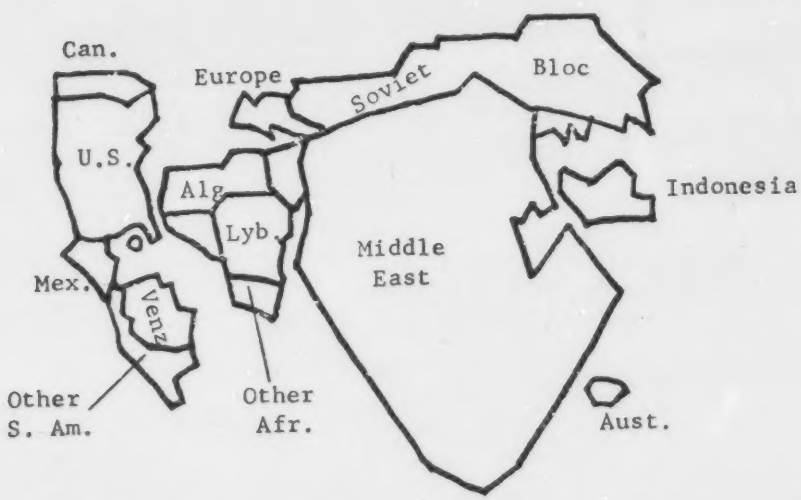



Our increasing consumption of energy, and oil in particular, seems destined to make the next dozen years a period of tight supplies. Development of new or alternative sources of energy will receive much attention. But such development requires substantial investment in projects that cannot be put into use quickly: opening a coal mine requires about 5 years; a nuclear plant, almost a decade. Still another limitation is supply capacity. Given even an unlimited fuel reserve, it is not clear that either environmental regulations or business prudence would allow rapid enough expansion in the delivery system to meet demand. For example the controversial Alaska pipeline, despite its planned operating rate of two million barrels per day, would need more than a quarter of a century to deliver the estimated 20 billion barrels of North Slope oil.

Our growing dependence on petroleum has the potential of creating severe problems for the United States and for New York State. Forecasts made in a recent report of the New York State Public Service Commission's Office of Economic Research[3] indicate that oil will supply some 54 per cent of the nation's energy requirements by 1980, compared with 42 per cent in 1970. The forecasts further indicate that as much as 56 to 72 per cent of this oil will be imported. From four million barrels per day in 1970, oil and gas imports are predicted to rise to between 16 and 22 million barrels by 1980. As implicit in Figure 7, most of these imports can be expected to come from the Middle East, principally Saudi Arabia, Iran, and Iraq. In light of the potential impact of even a slight petroleum shortage, the implications of our increasing dependence on overseas sources are obvious.

Figure 7. LAND AREA IN PROPORTION TO OIL RESERVES WHERE THE OIL IS--

As of January 1, 1971
World Total 611.4 Billion Barrels




If geography reflected the reserves of oil in the ground, the map of the world would look like this. (Source: Energy--The Ultimate Resource, U.S. House of Representatives Committee on Science and Astronautics, October 29, 1971, p. 100)

3. Alvin Kaufman and Thomas E. Browne, The Energy Crisis - An Overview, Office of Economic Research, State of New York Public Service Commission, Table 5, page 38.

## Issues and Policy

As of this writing, the United States does not have a recognized national policy on energy matters. A national energy policy is urgently needed to help in resolving the many issues attending the current trend of energy use in the United States. Among other things, policy formulation must address itself to balancing the difficulties in expanding and using our domestic energy reserves, against an acceptable level of oil and gas importation.

Other hard questions lie ahead as well. Can power plants be weaned from burning oil to make that fuel available for transportation? Will the public accept the known and unknown hazards of nuclear energy? Can utilities tolerate the uncertainties in ordering new nuclear generating plants? Should we, through the federal government, invest more time and money in research and development of alternative energy sources? Will any amount of research investment squeeze a significant flow of commercial fuel from oil shale? Can we trust that coal can come to the rescue through commercially feasible desulphurization and liquification processes? If so, can we accept the environmental degradation of thousands of square miles of land by strip mining? Can geothermal or solar sources of energy be developed to a point where they play a significant role in meeting energy demands? Should alternative energy sources that are commercially uncompetitive but nationally desirable be promoted by price subsidies? Should available supplies of energy be rationed? How?

One aspect of the energy situation has become a certainty: energy is going to become more expensive. The trend is already evident. An increase in the price of gasoline approaching 25 per cent is being felt in this state and elsewhere. Hard-pressed public transportation companies and transit authorities, already hit by fuel cutbacks and lack of bids from suppliers, are beginning to sign contracts for diesel oil at double last year's price. Fuel has been a lesser expense in the bus industry, but an increase of this magnitude can tip a private company into the red and will aggravate the need for financial assistance for transit operators.

## Supply and Demand at the State Level

Energy demand in New York State virtually duplicates the national pattern, with the state's primary energy consumption split among the four sectors thus:

| | |
|---|---|
| Transportation | 27.4% |
| Electric Utilities | 26.7% |
| Industrial | 11.6% |
| Residential-Commercial | 34.3% |

As in the nation at large, less than 3 per cent of the energy used for transportation in New York State is from sources other than petroleum.

On the supply side, a very high proportion of the energy utilized in New York State is derived from petroleum. In 1971 the sources of primary energy were:

| | | |
|---|---|---|
| Petroleum | 64.8% | |
| Residual Oil | | 24.8% |
| Distillate Oil | | 15.5% |
| Gasoline | | 19.2% |
| Other | | 5.3% |
| Natural Gas | 17.2% | |
| Coal | 9.4% | |
| Hydro and Nuclear | 8.6% | |

Oil and gas, which are often produced jointly, supplied 82 per cent of the state's energy requirements. Coal, which as recently as 1960 supplied 25 per cent of the energy, has suffered a remarkable decline to provide less than 10 per cent of the energy used now.

While forecasts of New York State's future energy supply/demand situation are necessarily somewhat uncertain, a few comments can be made regarding future energy supplies:

- Coal will continue to supply a decreasing share of the state's energy requirements unless technically and commercially feasible ways are developed to use coal with minimal adverse effects on the environment.

- Natural gas supplies available to the nation and hence the state will not increase, at least through 1980, and will actually decline for several years.

- Nuclear power will supply an increasing portion of the state's energy requirements, but is faced with many problems that will severely limit its growth for some years to come.

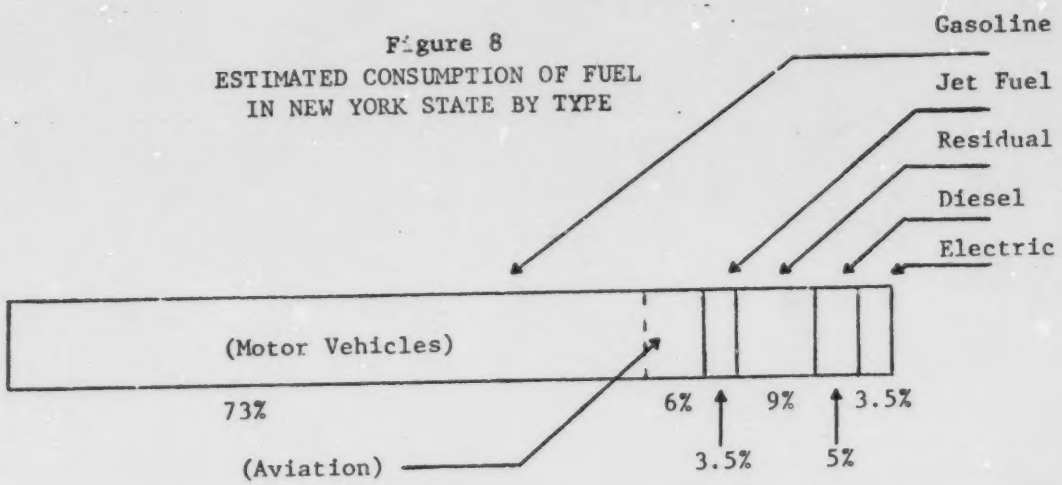
- The state's demand for petroleum will continue to increase, with almost all the incremental supplies coming from the Middle East. Approximately three-fifths of the petroleum consumed in New York State is imported as refined products or is refined from foreign crude oil.

## Transportation Energy in New York State

With the exception of the travels of pedestrians and bicyclists, practically all transportation in this state runs on oil; even the subways and commuter trains take almost their entire power from oil-fired generating plants. Estimation of energy use within the state among the principal transportation modes is complicated by some overlap in the kinds of fuel utilized. Major airports are a further complication as a substantial portion of the large volume of jet fuel pumped into aircraft at those facilities is consumed beyond the borders of New York State.

Acquaintance with the details of fuel consumption is not necessary, however, to appreciate the central feature of the consumption pattern as revealed in Figure 8. It demonstrates that one fuel -- gasoline -- is the predominant source of transportation energy. Gasoline accounts for 70 to 80 per cent of the total fuel consumed for transportation within this state, which is estimated to be some 6,400 million gallons per year.

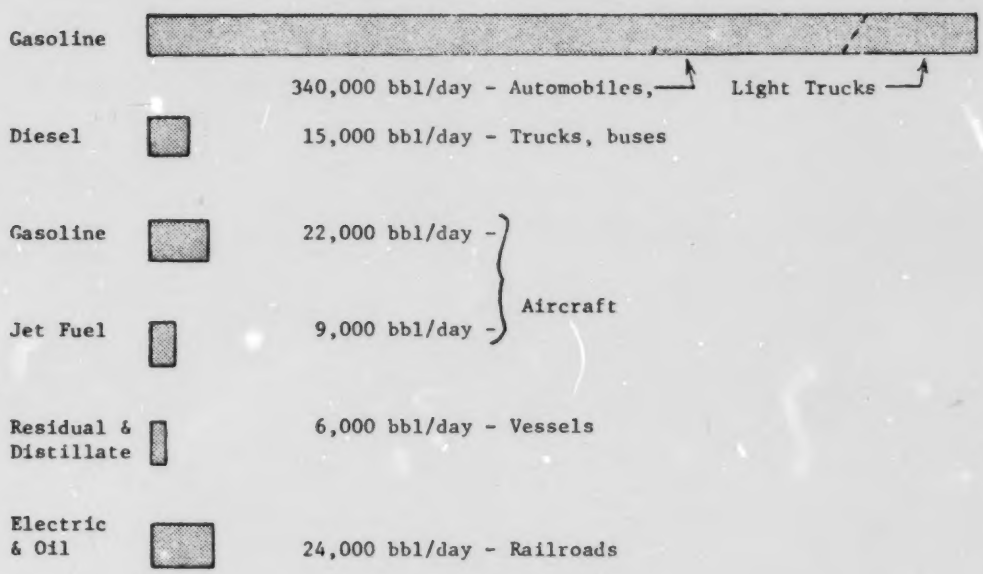
Figure 8
ESTIMATED CONSUMPTION OF FUEL
IN NEW YORK STATE BY TYPE




Source: N.Y.S. Department of Public Service

Figure 9 confirms what should be generally evident: automobiles consume by far the largest share of transportation energy. The implication of this is clear: a small improvement in average automobile fuel efficiency represents by far the greatest potential for transportation energy conservation. A 4% saving in automobile fuel consumption would be nearly as productive as a huge 50% reduction in fuel used by railroads within the state. Although concerned with the efficient

Figure 9
APPROXIMATE USE OF TRANSPORTATION
ENERGY SOURCES IN NEW YORK STATE BY MODE




Source: N.Y.S. Department of Public Service, as interpreted by the Ad Hoc Committee.

use of energy by all modes of transportation, because of this one overriding fact the Ad Hoc Committee on Energy Efficiency in Transportation believes the most fruitful course is to center attention on the performance and use of private autos.

## III. PROBLEMS AND ISSUES IN ENERGY CONSERVATION

The charge given the Ad Hoc Committee was for "evaluating various means of increasing efficiency in transportation". That might be construed as approaching the problem in terms simply of getting as much transportation as possible out of as little fuel as necessary. The reader should by now have come to realize that whatever the facts of the recent gasoline shortage and impending fuel oil troubles, they are but a portent of the situation facing this nation in the next dozen years or more. Accordingly the Committee has seen fit to enlarge its scope somewhat from concern merely with efficiency to the broader question of conserving energy, whether by more efficient transportation or by reducing travel itself. The issues involved are much the same, and the potential extra savings may be more in keeping with the emerging national energy situation. Since travel has associated with it some cost, hazard, and usually environmental impact, as well as the consumption of energy, measures for reducing the need to travel would seem to be consistent with the intended purpose of the Committee.

While the Committee is in accord with the goal of conserving energy, and generally concurs in a number of proposed measures, nonetheless at the personal level individual members hold widely divergent views. There seems little doubt that fuel-saving measures that may significantly restrain the growth in per capita demand for petroleum based fuels are sure to be controversial. Indeed, as the dimensions of the mid-term energy situation become more generally apparent, the proposed remedies are likely also to grow more demanding on the individual, and the whole subject of the proper and acceptable use of energy may become a matter of public controversy. One of the main contributions of this report may be to signal the possible energy controversy and spell out some of the issues that will demand resolution by governments at appropriate levels.

### The Motivation for Conservation

In light of the possible controversy some questions should be asked about the very notion of saving fuel used in transportation. Why conserve? In national terms the rationale for conserving fuel seems unquestionable. Evidence in the preceding chapter makes clear the trend of our rapidly increasing dependence on overseas oil supplies. These vast oil imports call for billions of dollars (possibly $20 billion every year by 1980) that could seriously impair this nation's trade balance. A few countries may gain the ability to disrupt our transportation-dependent economy, and their wishes will then come to have an inordinate influence on U.S. foreign policy.

Achieving independence from "black gold" blackmail may be worth foregoing some increases in consumption on the part of our people individually.

At the present level of consumption it will be very difficult for people raised in a culture of material plenty to adjust their individual actions toward reducing energy consumption. The motorist who is requested to drive with windows open and air conditioner off on a hot day may question why he should not use that device, as long as he has paid for it and is also going to pay for any gasoline he may use. Yet, even now, impelled by a variety of reasons, a small segment of the population is committed to consuming less than it can afford. It is not uncommon in the United States today to find people who are troubled by the worldwide disparities in resource consumption and our stewardship of those resources. As a matter of simple self-assertion they have adopted a life style that partly contradicts the dominant consumption-oriented culture. Thus we see that while there is a national interest in limiting consumption of petroleum, for the individual citizen such limitation may be a matter either of indifference or concern, depending on his own personal preferences and convictions.

In dealing with the problem of energy demand that is outstripping supply it is reasonable to begin with voluntary measures for lessening consumption. It should be recognized, however, that stronger incentives may be necessary -- and that raises the question of social equity. This is a matter worthy of separate discussion later.

Energy Usage and Economic Growth

One issue on which the Committee is not unanimous is the desirability of continued economic expansion. In economic circles what is termed "economic growth" was long considered almost universally desirable. As a precursor of prosperous conditions and full employment, the concept of economic growth thus enjoyed appeal as a social goal. Because the needs of an expanding population are a stimulus to economic growth, population growth was also looked upon favorably by many economists.

More recently, however, unchecked population increase has come to be regarded in some quarters as not desirable. And now among economists, to the extent that economic growth implies accelerated resource consumption, it too is coming into disfavor. Thus it is not suprising to find disagreement between opponents of what is seen as growth-through-overconsumption and those who wish New York State to prosper by attracting additional employment. Until the issue of economic expansion at the expense of faster resource depletion is resolved, though, it may be argued that as long as the national economy continues to grow we should strive to attract some of the benefits of such growth to this state.

## The State's Role

Why should New York State be interested in energy conservation? Isn't it primarily a matter for the federal government and the individual citizen? The answer is that conservation must become a matter of concern at all levels. There is justification for keen interest by this state, and for an active role that is in keeping with the tradition of New York State leadership. Besides, to the degree that the people of this state can be persuaded to rein their appetite for energy and embrace the conservation ethic, they will gain the environmental benefit of reduced pollution.

The main thrust for involvement of this state in transportation energy conservation, however, lies in modifying life styles and living patterns to a coming era of less plentiful and more costly energy. This modification may be competitively advantageous in the long run: by encouraging New York State citizens and commerce to become gradually more energy-efficient, outlays for fuels shipped in from out of state can be made to be relatively less important. The state is an appropriate level of government to undertake fostering the creation of new environments and adaptation of old ones better able to provide satisfactory living conditions with lower per capita fuel consumption. Especially with respect to travel and local circulation, New York has a clear interest in settings that are less transport-demanding and require less petroleum-derived fuel.

The rationale for state involvement in the ongoing motor fuel situation is no less compelling than in the case of saving energy in appliances and large buildings. In the transportation sector although our responses to the fuel situation may have to be based rather more on good citizenship than on tangible competitive advantages for this state, that does not make the responses less valid in the broader context. And if the "good citizenship" of New York State can set a good example for constructive actions by other state governments, the energy shortage may be eased nationally to the benefit of residents of our state as well.

In dealing with the current gasoline problem at the state level we appear to be limited to relatively bland measures for two reasons. First, popular support has not yet developed for governmental programs that would appreciably affect the consumption habits of the ordinary citizen. This is evidenced by the strong reluctance of the federal government to impose gasoline and diesel oil allocation formulas even in the face of recurring fuel shortages on farms, on construction projects, and for transit operations. Second, fuel shortages are a problem peculiarly requiring resolution on a nationwide scale: if, by sacrifice, fuel consumption in one state were greatly reduced, the savings would simply flow elsewhere. As a practical matter, moreover, vehicle taxes and regulations of

neighboring states tend to be so enmeshed with one another that unilateral action by any state (especially by increasing fuel taxes) would expose that state to the risk of serious difficulties.

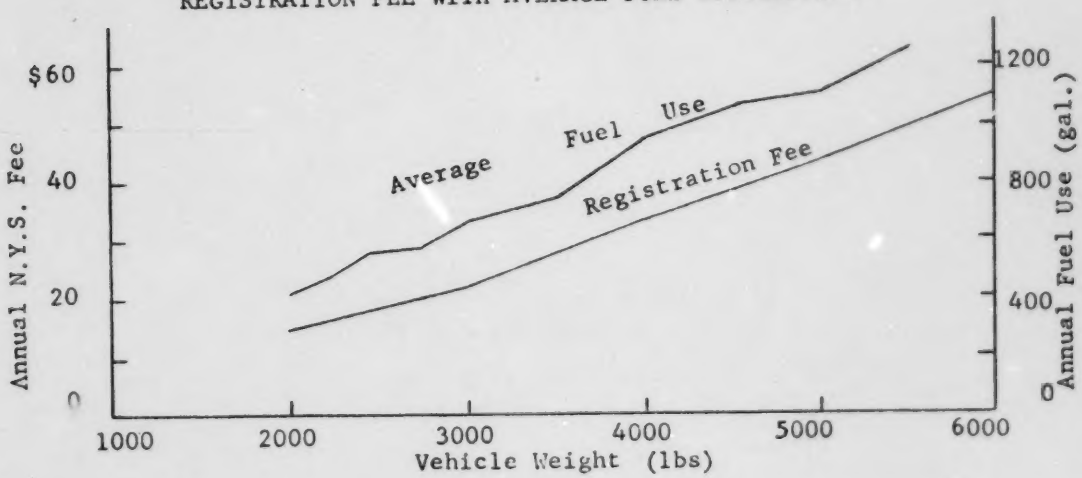
Taxation As a Conservation Device

The New York State tax structure applicable to fuel used in transportation is based largely on taxing highway and fuel use. Thus the motor fuel tax is applied at a cents-per-gallon rate, and in general exempts non-highway use. The fuel use tax is a supplement to the motor fuel tax, so that fuel purchased in other states for use in large trucks is taxed when used on New York highways.

The philosophy of the fuel taxes is not based on a concept of energy efficiency as such, but tends to be very compatible with that purpose. Motor fuel tax liability is in direct proportion to the amount of fuel used. Reduced taxes apply to buses, which are generally more efficient fuel users. This group of carriers pays 3 to 6¢ less per gallon than the normal rates of 8¢ per gallon on gasoline and 10¢ per gallon on diesel fuel, depending on the type of fuel used and service performed.

Motor vehicle registration fees, unlike the gasoline tax, are not directly linked to fuel consumption. Being based on gross vehicle weight, New York State fees are reasonably correlated with fuel consumption; see Figure 1. The correlation may not hold as well for

Figure 1. CORRELATION OF NEW YORK STATE VEHICLE REGISTRATION FEE WITH AVERAGE FUEL CONSUMPTION




Sources: Environmental Protection Agency (in New York Times, Sept. 16, 1973, p. 60); N.Y. State Dept. of Motor Vehicles

air conditioned or poorly maintained automobiles, nor for motorists whose annual travel differs widely from the normal. The fuel inefficiency of the pollution control devices on late-model vehicles is not reflected in the registration fee, either, but to penalize such devices through the registration system would seem to be highly inappropriate from the standpoint of environmental objectives.

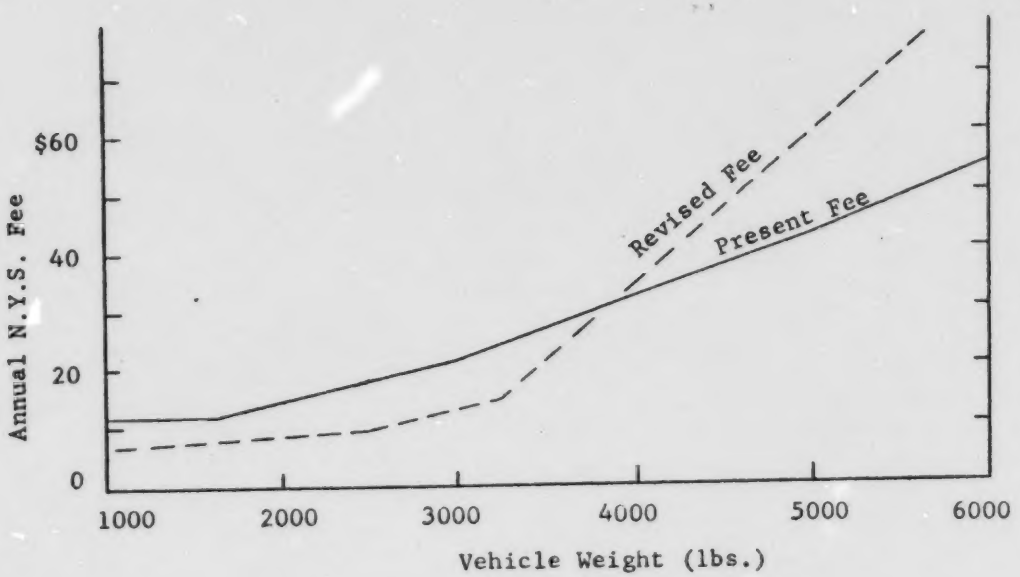
One method of reducing consumer demand for transportation fuels would be to impose a significant disincentive tax on motor fuel, particularly on gasoline, the largest users of which are passenger automobiles. Federal officials have spoken of a possible increase in the federal motor fuel tax (now 4¢) to as much as 14¢ per gallon as both an anti-inflationary and fuel conservation measure. For several reasons, however, to apply such a tax at the state level is highly inappropriate.

First, it is not feasible for a state to impose consumer excise taxes at rates significantly higher than in nearby states. A motor fuel tax rate that would be high enough to have a significant effect on consumer purchase decisions would also be high enough to create incentives to avoid taxation by making purchases outside the state. In addition, very modest excise tax rate differentials (in the case of gasoline, only a few cents per gallon) have been known to cause significant evasion and even the influx of criminal elements who can profit by purchasing goods legally in a low tax state and selling them illegally in a high tax state. Thus, a state tax on motor fuel that is significantly higher than in nearby states would be unsuccessful due to avoidance and evasion, would be injurious to the state's business climate by shifting sales from New York to out-of-state vendors, and would create serious enforcement problems.

Second, the state tax system is designed to produce revenue for support of direct expenditure programs rather than to indirectly effect major social policy objectives. Historically, New York has imposed taxes for general revenue purposes to meet general expenditure needs. Occasionally, the state has dedicated specific taxes for specific expenditures ("earmarked" revenues). For example, a portion of the motor fuel tax revenue was earmarked for several years in the 1960's for the purpose of repaying highway construction bonds. But to impose a tax of substantial magnitude, aside from a need for general revenue increases in the context of a balanced Executive Budget and Financial Plan, is not in keeping with traditional state tax policy.

In the vehicle registration fee program there is more freedom to make adjustments because registrations are closely regulated by the state, enabling the fee structure to be more readily enforced. Accordingly it would seem possible to increase and decrease rates in such a way as to encourage the easing of demands on fuel supplies, by creating an incentive to shift to more efficient, lighter vehicles. An arbitrary example of a vehicle registration fee schedule modified in this fashion is illustrated in Figure 2, where registration of the smaller automobiles would become less

Figure 2. EXAMPLE OF ADJUSTING VEHICLE REGISTRATION FEES TO ENCOURAGE SHIFT TOWARD OWNERSHIP OF LIGHTER AUTOMOBILES




costly. Its impact could be strengthened by requiring dealers to display on each auto a suitably designed window sticker listing the registration fee schedule and the yearly fee for that vehicle.

The new schedule of fees would have to be legislated. Those who felt adversely affected would be heard from: large families who need a large vehicle, motorists who "feel safer" in a big auto, tradesmen whose personal auto doubles as their own light truck, and many others. Who would support the legislation? Ecologists and "public interest" lobbyists, perhaps, arguing that New Yorkers

by acquiring more efficient autos will suffer less from shortages of gasoline. How would the people, generally, feel about this approach to saving a certain amount of gasoline? (And what is it saved for? For the more affluent in other regions to drive large automobiles? For recreational flying and boating?) Assuming that the issue of modifying the registration fee were widely publicized, the answer collectively would be in terms of the question, "Does this make sense to me?" Thus the public attitude toward the importance of saving energy is likely to have a heavy influence in determining the final outcome.

In view of the above considerations, realistic incentive proposals would seem to require the following features:

1. Any revenue increases should be coupled with expenditure plans to foster the more energy-efficient forms of transportation.

2. Any motor fuel tax increase that is significant enough to reduce demand for fuel would have to be imposed at the national level in view of problems of avoidance, evasion, and enforcement at the state level. It would seem appropriate, also, for federal revenues from such a tax to be channeled into increased public transit expenditure programs.

3. Effective state action might be possible by modifying registration fees to reward the greater fuel efficiency of smaller autos. Although only a moderate adjustment of present rates seems likely to be acceptable, it might significantly strengthen the growing popularity of smaller and lowered powered automobiles.

## Equity and Regressiveness

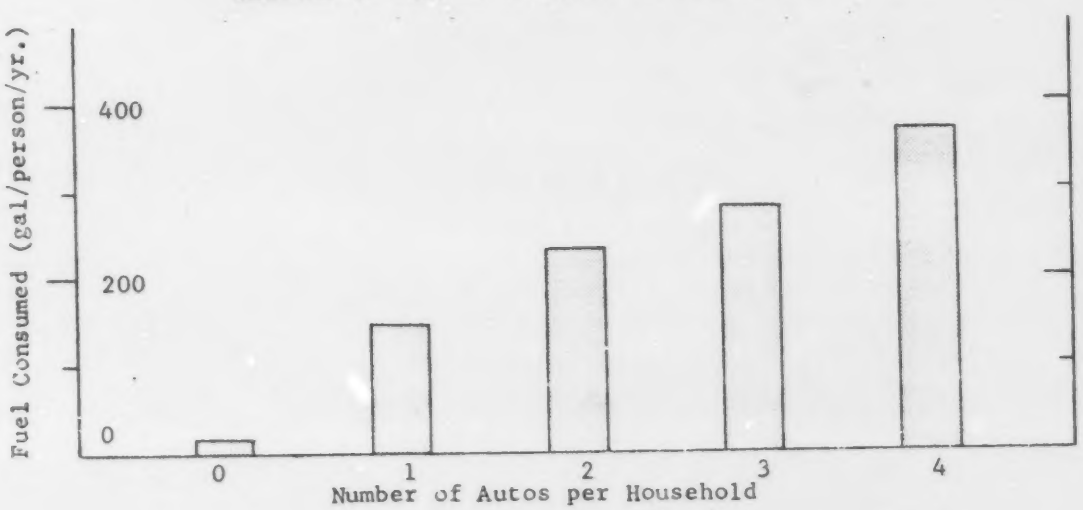
Having scanned a variety of problems and issues related to transportation energy, the question of equity or fairness remains to be considered. In the near term, significant fuel savings would tend to center on the private automobile, and therefore involve a large portion of the public. Measures intended to get the public to use less transportation energy than they could freely buy contain a risk of inequity. This applies even in the case of voluntary conservation programs, inasmuch as the cooperating fuel-savers gain little more than the satisfaction of "doing what is right" -- while their sacrifice frees more resources for the gratification of the noncooperators.

Any fuel-conservation measure involving incremental cost increases can hardly escape being branded as regressive; a substantial gasoline tax (were it feasible) would inhibit motoring by the poor considerably more than it would inhibit the well-to-do. Similar objections can be invoked against sharply restructuring the motor-vehicle fee schedule to make it cheaper to own a small, efficient vehicle but much more expensive to own and large and fuel-wasting one. The effects of such a revision would be felt considerably less by a prosperous family than by a large family that now is only marginally able to afford a single auto of ample size.

In connection with this concern about regressiveness, there is an interesting contrast between the mobility and fuel-use inequities likely to be perceived in a new tax proposal, and existing situations that go unnoticed. For example, analysis of data from metropolitan Rochester shows that members of households that do not have an auto manage to travel locally less than one-third as many miles per person as members of one-auto households.[4] Of course, special circumstances may explain much of the difference: autoless persons often can and do substitute walking; many of them travel less because they cannot afford the expense or because they are elderly; and families without an auto simply learn to repress the notion of visiting any place not reasonably accessible via public carrier.

Still, the fact is that autoless households do use far less fuel: as seen in Figure 3, their travel in Rochester and vicinity has been

Figure 3. FUEL CONSUMED FOR LOCAL TRAVEL, PER PERSON, RELATED TO NUMBER OF AUTOS IN HOUSEHOLD




[4]Based on analysis of data obtained in home interviews taken during the 1963 travel inventory for the Rochester Metropolitan Transportation Study, and on file with the N.Y. State Department of Transportation.

estimated to consume not even 25 gallons per person annually. More than five times that amount is used for local travel by the average person in households having one auto -- and households owning three or more autos consume over 250 gallons more per person than do autoless families. Yet, over the last decade persons lacking autos typically have experienced a decreasing opportunity for mobility, notably as evening and weekend transit service has become less frequent or even vanished altogether. Considering this negative reward for those already consuming the least transport fuel, the regressiveness of fuel-saving proposals may be relatively less inequitable than is commonly supposed.

Summary

In summary, the lessons of this chapter are that state actions on behalf of saving transportation energy are both justified and potentially important. What is more apparent, though, is that the state cannot go it alone in trying to alter existing patterns of fuel usage. In particular, for such matters as gasoline taxes and allocation of fuel supplies, action is needed at the federal level in order not to penalize any one state for taking the lead. Finally, the issues involved make it clear that there are substantial difficulties in even conceiving, let alone implementing, decisive measures that can have a significant effect in a relatively short period.

# IV. CONSERVING ENERGY IN TRANSPORTATION

The need for action is clear: the nation faces a serious and continuing energy problem, with petroleum as its focal point. It is also clear that this problem is national in scope, and the responsibility for coping with it is primarily federal. Many salient aspects of the situation are not clear, however. For example, how much energy ought to be conserved? There is no definite answer to this question although it determines the severity or mildness of conservation efforts. This illustrates the complex and controversial nature of energy policy. These difficulties notwithstanding, this chapter is directed to measures potentially available to New York State for lessening transportation energy requirements.

## Adaptation to Less Plentiful Energy

It is possible for our energy situation to become more serious than now imagined, just as today's problems were hardly imaginable a decade ago. Even an eventual surcease from this period of scarcity is sure to find energy staying relatively expensive. Possibly quite different values and living patterns would have suited the nation better in an era of worldwide pollution and rising demand for resources. Right now, however, it would seem enough that we merely commence adaptation of our habits and surroundings to expected years of lean energy supplies. Countless fuel-saving adaptations can be effected at all levels across the nation. Currently assurance is lacking that fuel saved in New York State will not be misspent in other regions, but adaptations need not be deferred pending a national energy policy that will avoid such inequities. The cumulative effect of energy-conserving measures in this state should benefit our local economy by reducing the need to import quite so much fuel from out-of-state sources. Local environmental benefits will accrue, too, from limiting energy consumption.

The concept of adaptation to conditions of less plentiful energy has long-range applicability in land use planning. Among planners there is now much support for more compact urban development, perhaps because intuitively it is felt to afford a more humane environment less dependent on automobiles. If families need to own fewer automobiles, a significant saving of fuel may be anticipated, according to the evidence on auto ownership and gasoline consumption presented in the previous chapter.

On these grounds the state can begin now on initiatives to adapt urbanized development -- existing as well as new -- to favor more energy-efficient local transport. This effort would be consistent with the Statewide Master Plan for Transportation.[5] Also, any early adaptation of the style of living in downstate New York to encourage use of more energy-efficient forms of transport would tie in closely with the air quality plan for New York City.

Thus an ongoing task for this Committee or its successor would be to participate in adapting conventional land use policies to a new cognizance of how transport affects energy consumption. These efforts could get underway by coming to grips with the seemingly simple matter of facilitating walking and bicycling as useful modes for general circulation in cities and suburbs. Equally challenging would be the working out of practical measures for preserving and improving all types of transit service. The probable focus of these efforts on land use policy would be to devise guidelines for assuring that very large areas (say 10 or 20 square miles) can be systematically developed in a fashion that would lessen the daily use of petroleum. It seems likely that the guidelines would, among other things, be concerned with the layout of local streets, walkways, and bicycle facilities, and with the provision of an efficient network of rights-of-way for transit service. An encouraging note is that the National Land Use Policy Act now being considered by Congress and given a good chance of passage later this year could foster re-examination of current beliefs about land use and transport.

It would hardly be consistent with the concern for energy-efficient land use patterns to ignore the current realities of energy-efficient transport. Transit and commuter rail facilities in New York State have been secured and improved through investment of hundreds of millions of dollars in public funds. To protect the effectiveness of that investment for conserving fuel (as well as air quality and road capacity), fares and the quality of service on those facilities must remain at an acceptable level. Passage of the Transportation Capital Facilities Bond Act of 1973 by the voters of New York State would initiate that process by freeing current state revenues to assist local communities by helping meet transit deficits, in order to help stabilize rail fares and keep bus and subway fares at 35¢ throughout the state. Failure to prevent sharp rises in transit fares would instead prolong the practice of catering to the needs of the motor vehicle, in a period when the national interest may no longer be able to afford that.

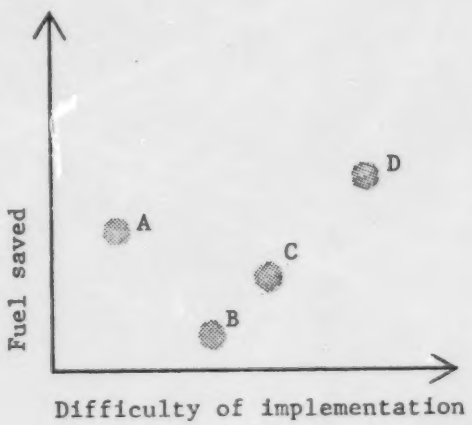
[5] New York State Department of Transportation, Statewide Master Plan for Transportation, (Albany, 1973), Volume 1, page 16.

## An Evaluation Technique

New York State government might respond in a wide variety of ways to the challenge of the energy situation. Out of the deliberations of the Ad Hoc Committee have come many ideas for action. Specific ideas or proposals (the terms are used interchangeably here) may range widely in their expense, presumed acceptability, and potential to save fuel. The problem was to sift out the more promising and implementable ideas.

To that end the array technique was employed for evaluating relative merit. Each idea may be rated on a vertical scale according to the expected fuel saving. The ideas may also be ranked along a scale of increasing difficulty of implementation. Thus when the proposals (labeled A, B, C, and D) are arrayed as in Figure 1, we can see roughly how they compare in difficulty and effectiveness.

Figure 1.
ILLUSTRATIVE ARRAY




To simplify presentation the various proposals have been divided among four arrays, according to whether the fuel savings have been quantified, and whether the proposals are judged generally acceptable or objectionable to the average individual. See Figure 2. Several ideas that have not been evaluated by the array technique, are described in a separate section that follows discussion of the arrays.

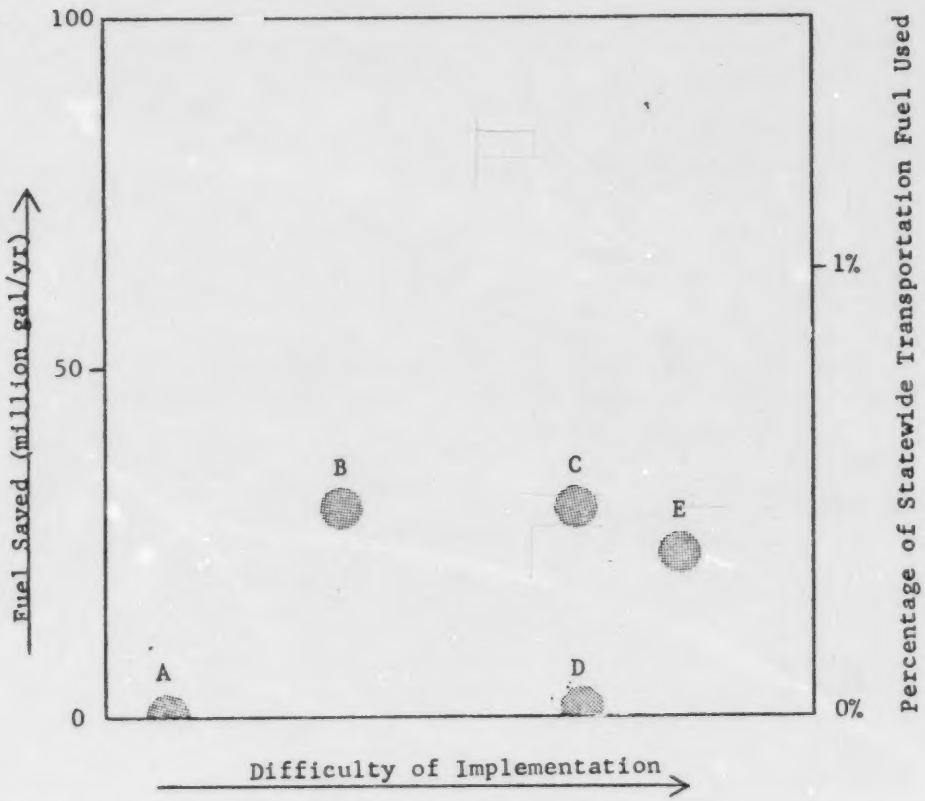
Figure 2.
DESIGNATION OF ARRAYS

| Fuel savings quantified: | Proposals: acceptable | Proposals: objectionable |
|---|---|---|
| yes | Array #1 | Array #2 |
| no | Array #3 | Array #4 |

Several of the ideas treated in the following pages are obviously difficult to administer or potentially very unpopular. They are included here merely by way of illustration, to give the reader a sense of scale, and do not imply Committee endorsement.

Figure 3

ARRAY #1: GENERALLY ACCEPTABLE FUEL CONSERVATION IDEAS
-- SAVINGS QUANTIFIED




KEY TO PROPOSALS:

A -- Substitute telecommunications for official travel on state business between New York City and Albany (Ad Hoc Committee Proposal #5).

B -- Promotion of auto-pooling for commuters (9% max. participation).

C -- High quality transit service, assisted by adequate subsidy.

D -- Albany-New York City high speed rail service (Ad Hoc Committee Program Proposal #4).

E -- Increased funding for installation and maintenance of improved traffic signal systems (saving one or two stops daily for every vehicle).

The highly conjectural nature of the following arrays must be emphasized. Naturally this evaluation technique is a subjective one, as there really is no way to quantify the difficulty of implementation of a particular proposal because of the intangibles involved. Thus its difficulty ranking is based on a composite of judgments about cost, opposition, compliance, administrative simplicity and the like. Fortunately, it has been possible to quantify energy savings in some cases by rough estimates (several of which are reproduced in Appendix A3). These estimates, coupled with knowledge of New York State fuel consumption, guided the ratings given the other proposals. Notwithstanding these disclaimers, the arrays are a useful evaluation technique. By identifying the more promising ideas for efficient use of transportation fuel, the technique can shape the framework for an implementation program.

It is no surprise that all of the large savings involve automobiles, a testimony to their great numbers and use; and despite the energy efficiency of public transportation, the fuel savings accruing from its use attest to the modest amount of travel via public carrier. The arrays also suggest how very limited is the amount of fuel that can be conserved within state government itself. Finally, against the backdrop of a statewide transportation fuel consumption rate probably exceeding the 6,400 million gallons per year used in this study, the potential savings of even the best proposals are slight. This is disappointing, but if confirmed by further study, it is a fact that should be known.

Array #1

Figure 3 arrays several energy conservation ideas that would seem generally acceptable, and for which the fuel savings have been quantified.

Judged the least difficult is the proposal to substitute telecommunications for state government travel between New York City and Albany. This was recommended earlier by the Ad Hoc Committee and is described more fully in Appendix A2 as Program Proposal #5. If the pilot installation for conducting conferences and meetings over closed-circuit television works out favorably, consideration might be given to extending its application geographically, thus enlarging the small fuel savings estimated for this experiment.

An idea that appears somewhat more difficult to implement is the promotion of auto pooling. Gasoline savings would be dependent, of course, on the degree of participation; 9 per cent additional enlistment is an optimistic upper limit. State efforts to increase the use of auto pools for commuting and other situations where group travel can easily occur would be a necessary part of this proposal. Experience suggests that pooling has not been popular where driving and parking are generally satisfactory. Therefore,

incentives may be needed, such as express lanes, reduced tolls, and preferential parking for autos carrying several occupants. Such rewards should be granted carefully, lest they thwart further implementation by antagonizing the non-participating majority who prefer or need to drive alone. A problem arises when one or more of the pool members does not share fully in driving and supplying the auto in turn. The legal implications of for-hire carriage and of promoting pooling deserve thorough examination, both with respect to the new no-fault liability law and to the financial impact on public carriers such as suburban bus companies. These questions being satisfactorily resolved, the state could develop a program to offer a computer matching service that would put people in contact with others whose origins, destinations, and travel schedules are similar.

Of considerably greater difficulty may be the idea of appreciably improving the quality of transit service with the aim of attracting more patronage and reducing dependence on private automobiles. The necessary subsidy would depend on the extent of implementation, and could be substantial. This idea conforms with the general intent, but rather transcends the specific recommendations, of the New York Statewide Master Plan for Transportation.[6] The savings in fuel depicted in the chart are based on tentative estimates but probably reflect at least the general magnitude of results to be expected under current conditions.

Next in order of probable difficulty in Array #1 is the proposal to initiate high speed rail passenger service between Albany and New York City. This proposal has previously been formally endorsed by the Ad Hoc Committee and forwarded to the Interdepartmental Fuel and Energy Committee, so it is not described in detail here; the full description is contained in Appendix A2. Moderate difficulty would be expected in implementing the proposal owing to its price tag of $38 million and the problems associated with revamping rail service in today's world. The array shows estimated fuel savings to be quite modest, but the proposal deserves to be advanced as a prototype and demonstration of what could be done in other geographic areas. If successful, the service could be extended from Albany to Buffalo, which is in accord with the Statewide Master Plan for Transportation.

Perhaps the most significant aspect of the high speed rail proposal is that it would be an attempt to modify life styles toward a mode of travel both safer and less demanding upon energy resources. If the motoring public in New York State can be induced to switch from their private autos to modern high speed passenger trains for trips in the more developed corridors of 150 to 300 miles in length, then the potential for energy savings is considerably above that shown in the array.

[6] op. cit., page 17-19.

Ranked as the most difficult proposal in the first array is the idea of increasing the number of traffic signal systems throughout the state that are capable of keeping traffic flowing as smoothly as possible. These so-called progressive signal systems require costly controllers (or complex computer controls for the more extensive systems in developed areas) as well as the maintenance needed to keep them operating effectively. But by reducing stop-and-go driving to a minimum such systems can effect a substantial saving in fuel: if every vehicle avoided only one stop-go cycle per day some 30 million gallons of fuel could be saved yearly. The difficulties in implementing this proposal stem from the costs of making the original installations in so many locations across the state, the number of municipalities involved in working out the local arrangements, and the increased annual outlays for maintaining the systems.

Array #2

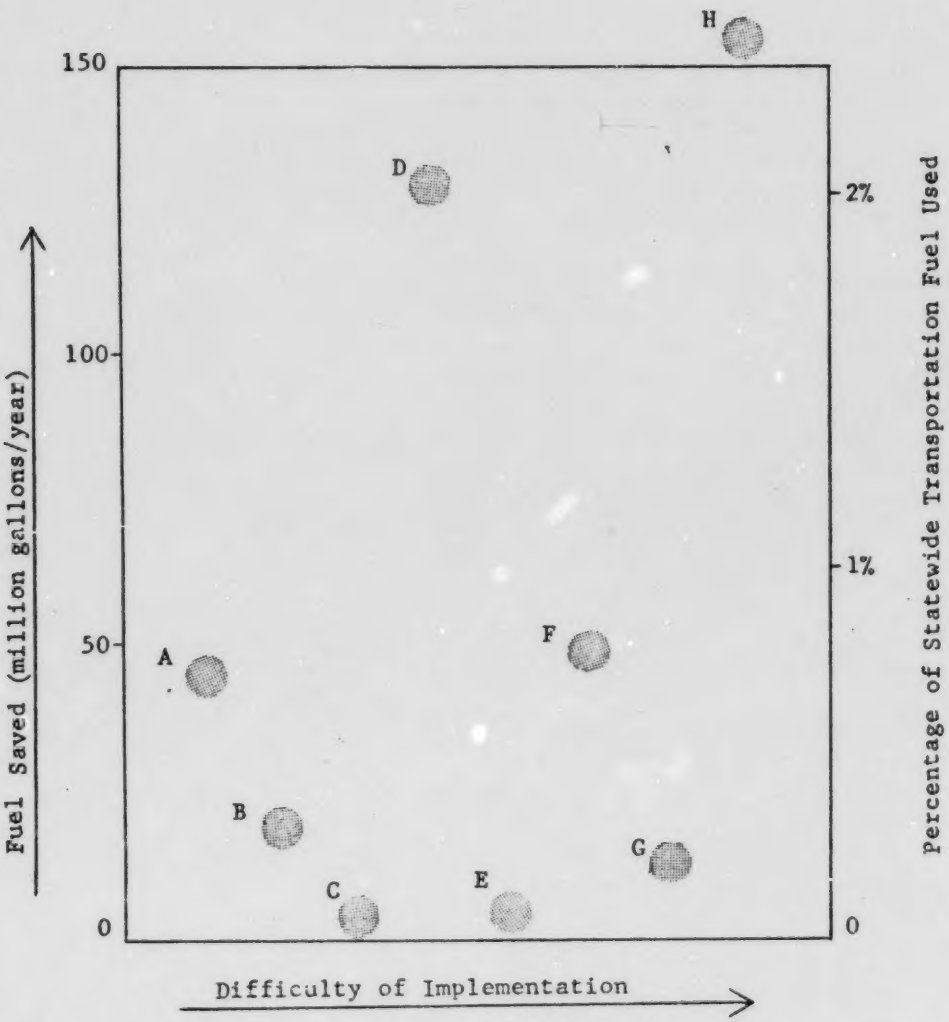
Figure 4 arrays various energy conservation ideas likely to impinge on individuals, and whose energy savings have been estimated. Because these ideas would affect societal actions through additional taxes or new laws regulating behavior, rather more opposition could be expected that with those proposals in the first array. Consequently, the horizontal scale here may be considered as extending to a more extreme range of difficulty. The fuel savings, quantified on the vertical scale, were estimated from rough but generally reasonable assumptions. The degree to which any of the ideas would be applicable is guesswork, however. By assuming that a proposal would be applicable in a certain percentage of instances the fuel savings associated with that percentage may be depicted as in Figure 4.

The first idea, charted at the left in the belief that it would meet little opposition, is to tax non-radial tires if studies confirm that they do in fact save fuel. The increasingly popular radial (or low-loss) tires are generally acknowledged to be longer-lived and to reduce fuel consumption. The program would start with a low excise tax on ordinary tires, with tax increases phased over a period sufficient to clear most of them from the supply pipeline. Thus when new tires became needed, it would be increasingly advantageous to buy radials. Administrative problems could be expected from individuals evading the tax by purchasing replacement tires out of state; that might be countered by regulating the use of untaxed non-radial tires through the state vehicle inspection system. In relation to the difficulty involved, potential savings are appreciable: some 45 million gallons per year if only 30 per cent of the vehicle owners are induced to adopt radial tires.

The second proposal would have the state require engine tune-ups on a periodic basis, much the same as safety inspections are now required. While the initial impetus for mandating more frequent tune-ups may well be to control emissions and thereby reduce air pollution, fuel conservation benefits would also result. If a two percent improvement in engine fuel efficiency could be effected in 20 per cent of the vehicles, the fuel savings would approximate 20 million gallons per year.

Figure 4.

ARRAY #2: PROBABLY OBJECTIONABLE FUEL CONSERVATION IDEAS
-- SAVINGS QUANTIFIED



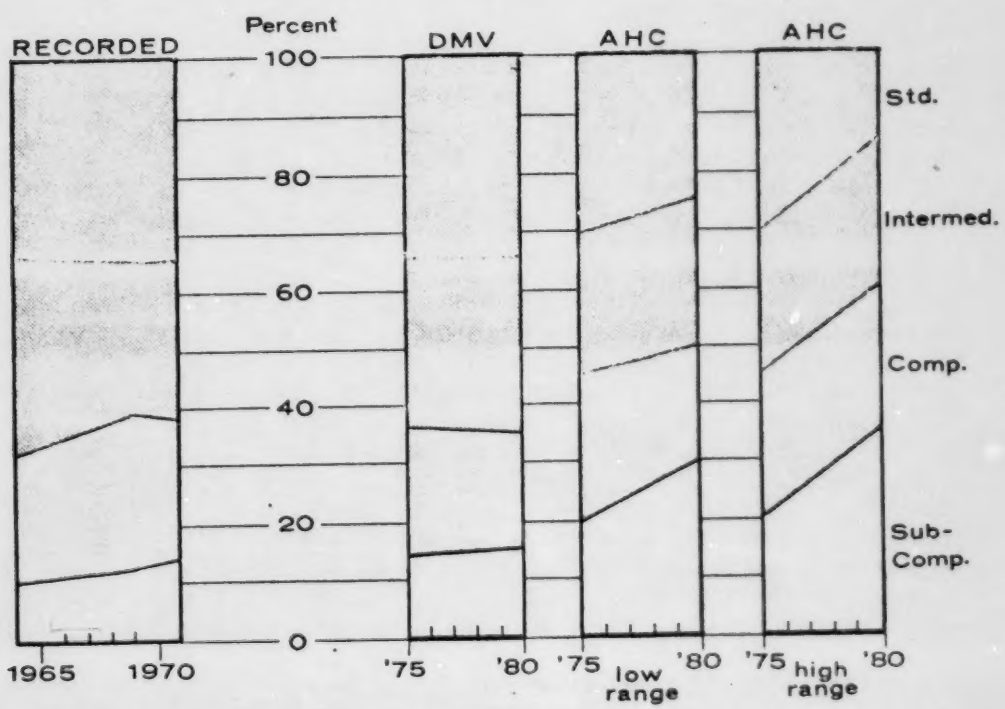

KEY TO PROPOSALS (and basis for applicability; see page 35)

A -- Excise tax on non-radial tires (vehicles).
B -- Compulsory engine tune-ups (20% of vehicles).
C -- State tax on civil aviation (reduction in flying).
D -- Revise state fuel registration fee in favor of small automobiles (conformance with AHC assumption; see p. A3-3).
E -- State tax on automobile air conditioners (vehicles kept from being equipped with air conditioners).
F -- Enforce state speed limit at 60 mph (full compliance, statewide).
G -- State vehicle registration fee that penalizes more than one auto in household (households relinquishing extra auto).
H -- Enforce state speed limit at 50 mph, except for buses (full compliance, statewide).

A state tax on air carriers and general aviation, mild enough to cause only a slight decrease in flying, was judged to be implementable over the expected opposition of aviation interests. Reduction in fuel use was estimated for a resulting one per cent cut-back in air activity, applied to the comparatively modest total amount of fuel consumed by all civil aviation within the state. As might be expected, the saving is slight. This particular notion does not seem a prime candidate for implementation.

Proposal D -- to modify the state vehicle registration fee schedule to discourage the ownership of large automobiles in favor of small ones -- is an instructive example of how incentives to save transportation energy might be legislated. The background for such a proposal has already been discussed in the previous chapter. In this array, the concept appears conspicuously effective, if the assumed shift to lighter vehicles can be achieved. This presumes a registration fee schedule increasingly favorable toward lighter vehicles and possibly also toward lower engine displacement. Figure 5 shows the hypothetical shift

Figure 5. DISTRIBUTION OF NEW YORK STATE AUTOMOBILES BY WEIGHT CLASS: OBSERVED AND PROJECTED




DMV: Forecast by Dept.of Motor Vehicles

AHC: Assumed by Ad Hoc Committee

in the auto population away from the Department of Motor Vehicles forecasted 1975 weight distribution and toward the next lighter class. Revision of the registration fees appears to promise comparatively large savings in fuel without unduely disrupting life styles: some 65 million gallons yearly in 1975 if by then half of the hypothetical shift were attained. Yet we should also observe that this two per cent cut in statewide transportation fuel use does not result in an immediate saving of energy.

Taxation of air conditioners in automobiles was ranked as a rather difficult idea, both because of its potential unpopularity and its expected enforcement problems. The temperate climate prevailing in New York State effectively moderates the impact of air conditioners on all-year gasoline consumption, so that taxing such accessories is estimated to yield only a slight fuel saving.

More significant in terms of saving fuel would be holding vehicular traffic to 60 miles per hour on all highways within the state. This of course has implications with respect to enforcement, and with putting New York at a disadvantage if adjoining states do not do likewise. This is another example of a program where national action is superior to an individual state's trying to accomplish meaningful results on its own. Estimated savings are depicted for full and 50 per cent compliance.

An extremely difficult proposal to administer, the next one on Array #2, would be the effort to penalize households possessing more than one automobile. The principle would be to levy a higher registration fee for each succeeding vehicle after the first one registered to the same surname at the same address. In estimating the fuel saved, it was assumed that the second or third auto would be dispensed with by 5 per cent of the multi-auto households. A requisite for any such scheme would be the provision of excellent public transportation as an attractive alternative for other family members lacking an auto. Even so, in the present context this approach to dissuading families from owning more than one auto must be judged impractical due to the difficulties of enforcement.

The proposal shown on the extreme right of the chart could accomplish quite significant fuel savings <u>if</u> it were able to be enforced. establishing -- and effectively maintaining -- speed limits of no more than 50 miles per hour on New York State highways could save up to 154 million gallons of fuel per year. But if enforcing a 60 mph speed limit is difficult, what would it take to get all drivers to hold their rate of travel to 50 miles per hour? That would amount to a substantial turnaround in American life styles, and a Herculean educational and enforcement effort would be required to bring it about. As an additional inducement to alter life styles toward more energy efficient travel, buses could be exempted from the 50 miles per hour speed limit -- further complicating enforcement.

Array #3

Figure 6 is a rather more hypothetical array than the previous two since nothing has been quantified -- neither the energy saved nor, of course, the difficulty of implementing the ideas. For many of them it would be almost impossible to estimate the fuel saved if they were applied. Nonetheless, because they are basically unobjectionable, these ideas are worth evaluating against one another in this necessarily subjective fashion.

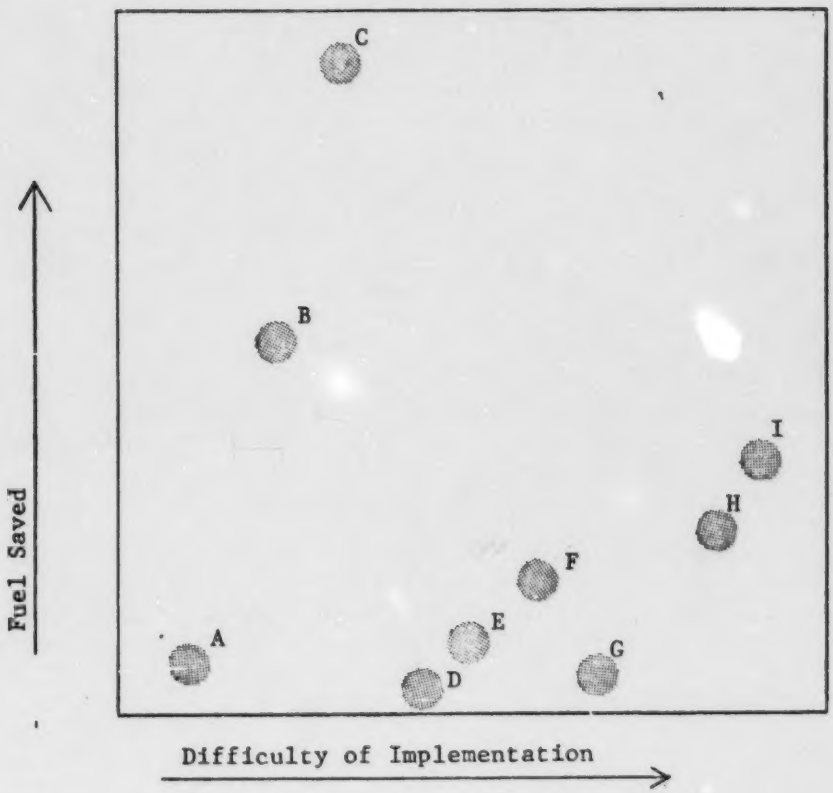
The proposal to increase airline load factors on flights within New York State by appropriate incentives is believed to be only moderately difficult to carry out, though admittedly the consequent saving in fuel might be limited. Conceptually an incentive might be developed (such as a tax on empty seats, as calculated from business records) that would spur airlines to reschedule or otherwise adjust their practices to effect a more efficient utilization of their passenger (or cargo) carrying capacity. It is recognized that scheduling complexities might preclude applying this idea on a merely statewide basis, however, so that this is probably another instance of dependence on unified nationwide action under the federal aegis.

A far more promising idea, and one that is in no way detrimental to the individual, is to require an energy efficiency rating (EER) on all new automobiles sold in this state. The idea is analogous to the EER information that must be supplied on all air conditioners for sale in New York City. Presumably there would be an urban and a rural gasoline mileage rating as determined by a standardized test procedure. With a state law requiring the EER figures to be placed beside the manufacturer's price sticker, the auto buyer may be guided to a more intelligent choice of the make and model that he will be operating in a period of impending fuel scarcity.

Rudimentary EER stickers will appear on nearly all 1974 models in automobile showrooms, having been called for recently by federal authorities. From published descriptions of such labels they are clearly only an expedient. Just as clearly, an improved EER standard must be developed. Although technical details pertaining to testing can be left to the vehicle manufacturers, other interests may help in defining the standards for "urban" and "rural" driving conditions. Through its potential to demand better EER tests for all autos to be marketed here, New York State is in a position to have a catalytic role in development of the much-needed standard test for automobile energy efficiency ratings.

Figure 6.

ARRAY #3: GENERALLY ACCEPTABLE FUEL CONSERVATION PROPOSALS
-- SAVINGS NOT QUANTIFIED




KEY TO PROPOSALS:

A -- Provide incentives to increase airline load factors.

B -- Require Energy Efficiency Rating (EER) be placed on all price stickers for new autos sold in New York State.

C -- Achieve general public awareness of the need to conserve fuels on a day-to-day basis (Ad Hoc Committee Program Proposal #1).

D -- Demonstrate fuel economies which can be achieved in State motor vehicle fleet (Ad Hoc Committee Program Proposal #2).

E -- Publish statewide transportation map showing intercity and suburban bus and rail routes and schedules.

F -- Assist transit operators in providing easily accessible and readily understandable information on available transit service.

G -- Reduce travel on New York State government business (Ad Hoc Committee Program Proposal #3).

H -- Utilize state resources to promote initiating bus "commuter clubs."

I -- Replace "STOP" signs with "YIELD" signs wherever feasible.

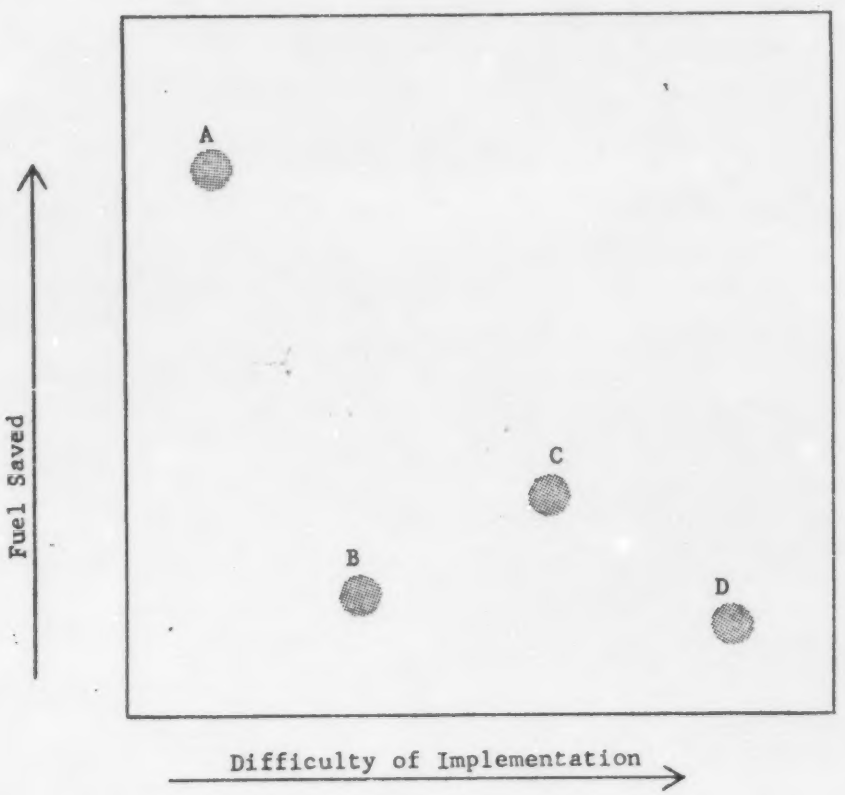
The proposal ranked next in order of difficulty in Array #3 is to achieve greater public awareness of the need to conserve fuel. In this regard an information program is of such obvious importance that it was discussed at the first meeting of the Ad Hoc Committee, and is the subject of its Program Proposal #1 (see Appendix A2). Members concur that a vigorous information and persuasion program is the key to helping citizens develop personal concern for saving energy resources in their everyday activities. That concern will foster a climate more receptive toward legislative intervention, if that should become necessary. And because a concerned public is in turn the key to so many possible reforms in energy use, this proposal is rated very high in its potential for conserving energy.

Designing and conducting a program adequate to do what is needed will be no small task, and its accomplishment will surely require more than merely assigning a few of the staff to work on it in addition to their regular duties . This matter is discussed further at the end of Chapter VI. A related and very interesting approach for stimulating consciousness about the energy situation is to incorporate its study into school curricula. A cooperative effort in curriculum development with the New York State Department of Education is envisioned in the original suggestion. Reproduced as Appendix A4, ideas it advances (and especially "Proposal B") merit careful consideration.

Use of State vehicles to test low-loss (radial) tires and low-lead gasoline is a proposal already being put into effect as a result of the Ad Hoc Committee's earlier recommendation (see Program Proposal #2 in Appendix A2) and the cooperation of the State Office of General Services. A small sample from the state automobile fleet is being operated in this program to measure the effect of the different tires and fuel on a pilot basis. The outcome of the test may be a useful guide in determining what combination of equipment and operating practices would achieve the best balance of environmental and energy-use factors if extended to the entire fleet.

Proposal E is to publish a statewide public transportation map, featuring the complex route network and schedules of intercity and suburban bus and rail services. This map would be a worthwhile step in the long task of enhancing the usefulness and appeal of the energy-efficient modes. If using public transportation is to be considered more frequently in the travel plans of people, they ought to be able to see readily what intercity routes are available, as well as the connections for reaching suburban locations. Otherwise, the complications of finding out how to reach an unfamiliar destination will shape the travel decision toward the private auto, if available.

Figure 7
ARRAY #4: PROBABLY QUESTIONABLE FUEL CONSERVATION IDEAS
-- SAVINGS NOT QUANTIFIED




KEY TO PROPOSALS:

A -- State review and control over new subdivisions and other major land uses to lessen travel demand as a long-term effect.

B -- State one cent "gas tax" surcharge.

C -- Statutory limit on the maximum amount which may be lent or borrowed in the financing of automobile purchaces.

D -- Levying an "ecology tax" of ½ mill per kilowatt hour on electric bills.

The next idea is similar to Proposal E in intent, and both are consistent with the Statewide Master Plan for Transportation.[7] By assisting transit authorities and transit companies in making readily available easily understood information on routes and schedules, public transit will become more usable for existing and prospective patrons alike. There is little doubt that adequate service information would help transit to attain its full potential for saving fuel.

The proposal to reduce travel on New York State official business represents an attempt to have government, in its own activities, conserve energy by eliminating trips or pooling travel resources. This proposal was the subject of an earlier Ad Hoc Committee recommendation (see Program Proposal #3, Appendix A2). Results are rated as comparatively small, which is necessarily so in comparison with total travel within the state.

The next proposal, to utilize state resources to help initiate bus "commuter clubs", is directed toward getting more workers to ride to and from work in an energy efficient bus rather than driving. Commuter bus clubs, where a group of people traveling from similar origins and destinations join together to charter a bus for the daily journey, have been in operation in several locations in the state. This proposal would utilize state funds and staff resources to publicize such arrangements and possibly underwrite start-up expenses during the building up of patronage. It could be an extension of the auto pooling matching service discussed under Array #1.

The final proposal in Array #3 entails replacing "Stop" signs with "Yield" signs across the State wherever traffic conditions will permit. This idea is similar to the proposal to install progressive traffic signal installations in order to reduce stop-and-go driving. While only a very small amount of fuel is saved by a vehicle that is required to slow to a prudent speed rather than making a full stop, the aggregate saving could be substantial for a widespread program.

Array #4

Figure 7 is another very conjectural array, and deals with ideas that would doubtless be unpopular; fuel savings were not estimated. The first idea calls for State review and control over new subdivisions and other large land developments in order to shape long-term development to lessen automotive travel. This concept was described in detail at the beginning of this chapter as an illustration of adapting life styles and living patterns to a less abundant supply of fuel.

[7] op. cit., page 39

The second notion is to raise the state gasoline tax by one cent per gallon, with the expectation that a comparable amount could be made available from the general fund for the support of local public transportation in the county where collected. In counties that lacked urban transit or localized public transportation service, the transit support funds would still be useful, since the Statewide Master Plan for Transportation[8] identifies mobility as a problem in the rural parts of New York State and recommends that experimental transit programs for dispersed rural residents be encouraged.

It bears emphasizing that the only state gasoline tax increase mentioned in the arrays is this relatively modest effort of one cent. As discussed in Chapter III, an increase of greater magnitude is likely to create more problems than it solves; high taxes on fuel consumption are seen in this report as an option open exclusively to the federal government and even if taxation is desirable to provide a stimulus for conserving energy, states cannot be expected to move on their own in this matter.

Both legally and administratively dubious, but judged capable of saving more fuel, is the next idea: to place legal limits on the maximum amount that may be lent or borrowed in the financing of automobile purchases. This is another device to inhibit automobile ownership, of course, and is likely to be criticized as discriminating against those in the lower income brackets. To overcome this objection, the lending limit might be pegged on a sliding schedule to the EER of the vehicle (or its weight), allowing a small auto to be financed far more liberally than a heavy one.

The last idea suggests an "ecology tax" at a rate of one-half mill per kilowatt-hour on electric bills within transit districts, with the revenues being earmarked for the local transit authority. This idea follows the philosophy of taxing energy consumption to assist a service that is potentially energy-efficient. The presumably modest saving of transportation fuel from this proposal would to some degree be augmented by energy savings due to more careful use of electricity.

## Energy Conservation Ideas that Have Not Been Evaluated by the Array Technique

Several additional ideas whose potential contributions to the transportation fuel conservation effort have not yet been evaluated are included here to call attention to the wide variety of possible measures for saving fuel.

8 op. cit., page 40

(1) Freight transportation within New York State consumes relatively little fuel, and the possibility of improving fuel efficiency appears limited. In March, 1973 the New York State Department of Transportation did take action temporarily allowing greater routing flexibility for motor carriers under its jurisdiction. Elimination of requirements for trucks to operate through certain "gateway" cities has given trucking companies the option of arranging their routes to lessen truck travel while maintaining existing service. Railroads are generally recognized as being the more energy-efficient freight transportation mode, but in their current financial condition they are unable to maintain uneconomical branch lines. The Transportation Capital Facilities Bond Act of 1973 would allow the state to assure the preservation of service on branch lines that would otherwise have to be abandoned. Although the basic philosophy underlying the state assisting in the preservation of railroad freight services is to maintain a healthy local economy, fuel savings are likely to result from the retention of traffic by the railroads that might otherwise be diverted to less energy-efficient modes.

(2) Encouragement of and provision of suitable facilities for other circulation modes also offer a method for fuel conservation. Walking and bicycling are usually placed at considerable disadvantage in a society catering to the automobile. And, while these modes are obviously only suitable for trips of relatively short length, they do offer a potential of reducing the demand for gasoline -- and the obligation on parents of frequent chauffeuring of youngsters. For the long-term effect on forming aspirations and habits better attuned to the energy ethic, it would be desirable that youngsters learn not to be dependent almost exclusively on the school bus and family auto for mobility.

(3) Park-ride operations are a form of public transit service in which commuters park at facilities within a few miles of home and then travel via bus for a longer distance to their place of work (which is usually in downtown, but may be at any major employment center). This form of service, oriented to suburban commuters, saves fuel by substituting the travel of one bus for the travel of two dozen automobiles. Park-ride service has been successfully extended to a number of communities in suburban Rochester by the Regional Transit Service, generally in cooperation with shopping centers which allow the park-ride patrons to use parking spaces that are not needed during weekdays.

(4) Research and development programs in both the automotive and transit-equipment fields offer the prospect of effecting a long-range improvement in efficiency of transportation fuel use. Automobiles may be made more efficient by better streamlining and improved engines, drive trains, and overdrive options. In the rapid transit field an important experiment is under way to test the feasibility of saving some of the energy that is now lost each time a subway train is braked to a stop. The Metropolitan Transportation Authority has equipped two cars with two experimental flywheel units apiece, and will be conducting measurements to validate preliminary calculations which have indicated as much as a 30 per cent saving in traction energy consumption by means of flywheel storage.

(5) The imposition of regulations to prohibit or sharply curtail the use of private autos in the central business district would seem to offer the double advantage of fuel conservation and reduced pollution. Restrictions that severe are quite possibly justified in New York City and vicinity in the interest of air quality requirements alone. In the context of smaller cities, however, the virtual exclusion of automobiles from their downtowns might be counterproductive. Unless alternative means of access and local circulation were offered that were dramatically more attractive than what is currently available, persons who were accustomed to driving their autos to and within the central business district might instead take their business to suburban establishments. The result could be a further weakening of downtown, and accelerated dispersion of employment and retailing, with a consequent increase in gasoline consumption. This example is included as an illustration of the need for careful scrutiny of ideas directed toward fuel conservation.

(6) Although these pages are concerned with possible options for New York State in dealing with the transportation energy problem, brief consideration of the possibilities for federal action is worthwhile. These are, after all, measures that by their nature would properly be a federal responsibility since their application on less than a nationwide basis would be most undesirable. Three such measures are: a substantial surtax on motor vehicle fuel, gasoline rationing, and lowered highway speed limits. It is well to remember that although these and other unpopular ideas may be discussed merely in the abstract, in practice they would doubtless be invoked only with great reluctance by the federal government in response to a very serious worsening of the energy situation.

There is no doubt that a vehicle fuel surtax that greatly increased the total price of fuel at the pump would cut fuel consumption by deterring people from their less necessary traveling. This kind of tax disincentive could be administered comparatively easily if levied on producers and importers, from whom it would pass through to the retail level as a higher price. To maintain administrative simplicity no exemptions could be allowed and, indeed, if a comparable "energy surtax" were levied at the source on all fuels in short supply, opportunities for evasion by substituting fuels (as liquified propane for gasoline) would be negligible. Yet the price of this administratively workable approach is its obvious regressiveness. This deplorable feature would be compounded by the abrupt impact of the surtax on those families who are now dependent on the use of much gasoline because of the location of their home in relation to their other economic and social activities.

Rationing, it is often pointed out, does nothing to increase the amount of fuel; but rationing can assure supplies for the highest priority needs. By truncating the power of money, rationing of gasoline to the individual motorist (as practiced in World War II) preserves a high degree of social equity and can ameliorate unusual individual hardship. Yet rationing by coupon (if not by "credit card") does in effect introduce a parallel system of quasi-currency, with its associated problems of security, auditing, and risk of counterfeit or fraud. While rationing succeeded in the early 1940's when the nation was caught up in patriotic sacrifice against powerful enemies, there is doubt about the sustainability of a fuel rationing system nowadays.

A nationwide reduction in highway speed limits does have some potential for saving energy, as demonstrated by the calculated New York State savings indicated in Figure 4. A national speed limit has the desirable quality of assuring that this means of saving fuel applies to all motorists equally. Also, if there are no high-speed and low-speed states, situations are avoided where traffic would be diverted from a low-speed state to the detriment of its economic interests. But non-compliance would be no less difficult a problem at the national than at the state level, with the further complication of depending for enforcement on a variety of police forces that are under state or local jurisdiction.

## V. RECOMMENDATIONS

The Ad Hoc Committee on Energy Efficiency in Transportation arrived at one conclusion quite early: the ability to achieve energy savings through state actions is quite limited; the opportunity to exercise maximum leverage in conserving energy exists principally at the federal level. Consequently, one of the best things the state can do to bring about more efficient use of limited energy resources is to influence the Federal government to make changes in national policy, laws, and commitment of funds to serve the purpose of saving energy without penalizing any one state, or group of states.

A second major conclusion reached by the Ad Hoc Committee is that conservation measures involving the automobile have a large potential for pay-off because of the sheer numbers involved. Therefore, the major savings in transportation fuel depend on making the automobile more-energy efficient, or diverting travel from the private auto to other modes that are more energy-efficient.

### Important Actions for Federal Level

There are two actions that would contribute heavily to saving energy in transportation which can only be accomplished at the federal level: (1) a substantial increase in the tax on motor fuels, and (2) reduction in speed limits.

The first of these has been discussed previously on page 23 and the only principles which need be reiterated here are that the tax should be phased in slowly to give consumers an opportunity to switch to more energy-efficient vehicles and that the final tax level should be substantial in order to have a market place impact. It is also recommended that the proceeds from the increased tax be earmarked for the goal of conserving energy through advanced research, assistance to public transportation, or both.

The reduction in speed limits could also be successfully accomplished only at the federal level so that states are not played off against one another. Actually, the Ad Hoc Committee does not give this proposal an unequivocal endorsement because the Committee believes that the problems of enforcing a 50 mph speed limit would make the law largely unworkable. At best a 60 mph national maximum might be useful. The Committee feels, however, that other proposals (such as a rising tax on gasoline, an educational campaign against high speed

as wasteful of fuel, and measures favorable to lighter vehicles that may be less conducive to speeding) might together have much the same result without the severe enforcement problems of making a drastic change in people's driving habits.

Other federal actions that would be particularly helpful in bringing about energy savings in transportation are measures to improve the status of public transportation as an attractive alternative to the private automobile. Federal subsidies to assist in the operation of urban transit systems would be one such measure since local units of government are extremely hard pressed to maintain -- much less improve -- existing standards of transit service.

Earlier Proposals of Ad Hoc Committee

In November, 1972, the Ad Hoc Committee on Energy Efficiency in Transportation, in conformance with its charge, started submitting recommendations on actions that might be taken in the near term to achieve better energy efficiency in transportation. In the period from November 29, 1972, through May 10, 1973, five proposals were transmitted to the Governor's Interdepartmental Committee on Fuel and Energy. All five of these proposals and their explanatory transmittals are reproduced in Appendix A2.

The Ad Hoc Committee's Program Proposal #1 was to initiate a coordinated education program designed to increase the awareness of state employees and the general public on the current energy situation and what individual and collective conservation measures can be taken to alleviate anticipated shortages. This proposal was bolstered by the work of the other Ad Hoc Committees serving the Governor's Interdepartmental Committee on Fuel and Energy, and that Committee has moved to implement an educational program by assigning this as one of the functions to be carried out by the Committee's new supporting staff.

After the educational proposal was originally submitted last November, the Ad Hoc Committee gave this concept additional consideration and now believes more strongly than ever that the re-education of the public on the significance of the energy situation, and the actions that each citizen can take to forestall any possible shortage, is essential to modifying the present trends. The Ad Hoc Committee now feels that the education program should be broadened to the fullest, and has enlarged its original proposal to include special attention to energy matters in the school system. This enlarged two-part proposal is contained in Appendix A4. The assigning within the Department of Transportation of permanent staff for energy matters would assure that significant assistance could be provided in development of the proposed school curriculum on energy conservation, and in operating a strong and persuasive public information program.

Program Proposal #2 concerned a pilot program of measuring fuel savings that might be realized through the use of radial tires in the State motor vehicle fleet. The Office of General Services has already embarked on this pilot test.

Program Proposal #3 was to redirect State employee travel habits and patterns through a Governor's Executive Order so that energy savings might be realized. This proposal remains to be taken up by the Governor's Interdepartmental Fuel and Energy Committee and the Ad Hoc Committee commends it to the Interdepartmental Committee for further consideration (see Appendix A2).

Program Proposal #4 was aimed at determining whether the provision of reliable, comfortable, high-speed rail service operating on convenient schedules would have a measurable impact upon the travel market in a high density corridor in New York State and whether there would be sufficient diversion of travellers from less energy-efficient modes to contribute to fuel conservation. The Albany to New York City corridor was selected as a good site to demonstrate the potential of high speed rail service for saving fuel, and the Ad Hoc Committee recommends support of the concept. (See Appendix A2). Funding to permit the undertaking of the project would be provided within the proposed Transportation Capital Facilities Bond Act of 1973 which will be submitted for voter approval at a general referendum in November, 1973.

Program Proposal #5 recommends the establishment of a closed circuit telecommunications system between New York City and Albany as a one-year pilot program to conserve energy by reducing the number of automobile trips between these cities, and as a test to measure the potential for such systems in reducing travel demands on a statewide basis.

At the Ad Hoc Committee meeting held on November 14, 1972, the matter of providing government-supported operating assistance to public transit systems was discussed at some length. The value of transit as an energy-efficient travel mode was recognized, but at that early time the Ad Hoc Committee was not prepared to endorse any specific proposals on this issue. Accordingly, the Ad Hoc Committee in its letter of November 29, 1972, recommended to the Governor's Inter-departmental Fuel and Energy Committee that it take a position of public advocacy for the concept of a program of government-supported operating assistance to public transportation systems. (See Appendix, page A2-2).

Since that time the Transportation Capital Facilities Bond Act of 1973, enacted at a special session of the New York State Legislature, would make it possible to free $399.1 million of current revenues normally devoted to highway construction for the alternative purpose of providing transit and railroad

operating subsidies during 1974 and 1975. It is important to note that if energy conservation efforts directed at reducing the dominance of the private automobile are to have any possibility of succeeding, attractive alternatives must be made available. Right now public transit is virtually the only alternative to the urban use of automobiles, and its present deterioration must be reversed in order for transit to remain in the running as an available transportation form.

New Proposals

In addition to the proposals formally submitted to the Governor's Interdepartmental Fuel and Energy Committee previously, the Ad Hoc Committee on Energy Efficiency in Transportation, based upon subsequent deliberations and analyses described earlier in this report, wishes to recommend several additional proposals for consideration. In general these are proposals selected from the arrays contained in Chapter V which either hold promise of being relatively easy to implement (and are therefore worth doing even though their energy saving may be relatively small) or else are likely to result in higher payoffs (and are therefore worth the extra effort).

These additional proposals now recommended are:

(1) Require an Energy Efficiency Rating (EER) to be placed on all price stickers for new automobiles sold in New York State.

This would be a consumer education measure that could hardly be opposed, provided that agreement can be reached on what constitutes a reasonable EER. In view of the progress being made by Federal agencies in the testing and rating of motor vehicles for environmental pollution purposes, it does not seem unreasonable to commence action on developing a standardized EER test procedure. New York State is in a position to insist that a fair and meaningful EER definition be developed quickly, and to participate in that effort. Given the prospect of persisting gasoline shortages and rising prices, there will be greater demand for better gasoline mileage among all models of automobiles. The manufacturers are sure to respond to this demand as a competitive challenge, although the response will necessarily take effect over a period of several years.

(2) Encourage use of radial tires and periodic engine tune-ups.

The Ad Hoc Committee at this time does not recommend imposing a tax on non-radial tires or requiring periodic engine tune-ups by law as discussed on page 35.

However, there appear to be sufficient energy saving benefits in the use of radial ply tires, and in obtaining engine tune-ups on a regular basis, that these two items should be highlighted in any educational program in which the state engages.

(3) Revise state vehicle registration fee in favor of small automobiles.

This proposal, discussed in detail on pages 24 and 37 has the potential for saving a comparatively large amount of fuel. The idea is to discourage the ownership of large automobiles and encourage the acquisition of smaller, more energy efficient, vehicles by modifying the registration fee schedule so that the typical motorist will pay about the same for his annual auto registration but the owner of the large and heavy luxury-type vehicle will pay substantially more.

To accomplish this recommendation, Section 401, Sub-Section 6, of the Vehicle and Traffic Law will have to be amended. There is likely to be considerable opposition to the amendment even though the total revenue to the state can be designed to remain the same. If a sufficient energy awareness is created among the public, however, the revision will be easier to accomplish. Probably the most plausible reason for opposition to modification of the registration fee schedule to favor the small vehicle is the concern about safety. This concern should become less valid as the automotive industry produces safer small autos; fewer large vehicles remain in the traffic stream; and the average speed of highway traffic flow is lessened.

(4) Improving Fuel Efficiency of Suburban Commuters

Most of the traditional forms of public transit consume relatively less energy per person-mile in carrying commuters to and from work than do private automobiles, with their characteristically low occupancy (often not over 1.2 persons for work trips). While regular fixed-route bus transit operations effectively serve many commuters in all but the smallest cities of the state, and rail transit and train operations carry large passenger volumes efficiently to and within New York City, specialized transport services should be developed so that residents of the outer suburbs may be enabled to commute without using as much fuel as they do in driving alone. Park-ride service, and pooling by private auto or in commuter club buses seem particularly suited to the

specialized commuting needs of residents of lower-density suburbs. In the interest of conserving transportation energy, the state should promote these modes where appropriate.

It is recognized that pooling in private autos may be a competitor of bus clubs, and both may compete with the public park-ride service which is available without restriction to everyone. Because of the financial implications of this potential competition, it will be desirable to formulate a policy to assure that these modes compliment one another to the greatest practicable degree in any community. With this matter resolved in in an orderly fashion, the state can undertake the promotion of all three services. It is suggested that the least specialized and exclusive service, park-ride, be implemented first. The remaining market could then be explored for possibilities to inaugurate commuter bus clubs. Auto pooling would be promoted with an emphasis on filling in where commuter needs could not be served by buses.

Both of the bus modes might receive financial aid during the building up of patronage to the break-even point, as well as technical assistance on publicity and marketing. With state assistance, local transit authorities might be encouraged to seek out promising markets for park-ride service from suburbs to downtown and to other locations as well. The formation of bus clubs might benefit from somewhat the same automated match-up service as offered for developing auto pools. State and local governments could foster auto pooling by offering an automated match-up service. Commuters desiring rides or willing to provide rides on a regular basis could complete a form on where they want to go, from where and at what times, and the computer would then supply them with a list of names and telephone numbers of people with the same travel desires. The actual setting up of pooling arrangements would still be left to the individuals involved.

Supplementing the automated match-up service should be investigations with the State Insurance Department to see if the liability encumbrances of "sharing the ride" with persons willing to pay outright for the service could be removed, or at least lessened.

(5) Reexamine land use concepts and regulations with reference to reducing transport fuel consumption

Present-day land use policies and patterns of urbanization have evolved during an era when the private auto enjoyed almost uncritical acceptance as the favored urban transport mode. Now buildings are frequently so sited, and new streets so patterned, as to nullify the practicality of other modes in the suburban environment. Even in cities, circulation is heavily dependent on autos. Many families consider that they need to own several autos, and the greater availability of vehicles in a family evidently is accompanied by additional travel using additional fuel. Three-quarters of all fuel used for transportation in New York State is consumed in automobiles.

The desirability of letting the urban and suburban environments be so dominated by the needs of automobiles is coming into question. Still, most urbanization of land continues in this pattern, in accordance with zoning, subdivision, and building regulations that gained acceptance as autos became increasingly prevalent. The emergence of what may be protracted fuel problems suggests that this is the time to embark on a program of reexamining the conventional assumptions underlying land development practices. New land use policies might be formulated that would be hospitable to life styles and patterns requiring less energy than contemporary ones. There is need also for creative ideas on adapting existing urban development (insofar as that may be feasible) to the new energy situation.

To carry out this proposal it might be considered that the State Office of Planning Services undertake responsibility to chair a task force of state agencies and others concerned with land use. This task force would endeavor to analyze the energy requirements implicit in contemporary land use policies and practices. It would go on to formulate guidelines for future urbanization having lower fuel requirements for transport and other purposes. It is anticipated that the task force would include representation from the Department of Transportation in keeping with its concern for sound transport and land use planning.

## Continuing Efforts

At the September 13, 1973 meeting of the Ad Hoc Committee on Energy Efficiency in Transportation, concern was expressed that its efforts to identify and emphasize continuing concerns with transportation energy shortages should not cease with the publication of this report.

The Committee believes that there must be a continuing effort to carry out the recommendations made herein and to develop and evaluate additional transportation energy conservation measures working under general guidance from the Interdepartmental Fuel and Energy Committee. Therefore, the Ad Hoc Committee formally adopted a resolution recommending that the New York State Department of Transportation be assigned this continuing responsibility to assure the further development of acceptable energy efficiency measures for the transportation sector. The Committee recommends that this responsibility be carried out by the Department in cooperation with the Interdepartmental Fuel and Energy Committee and with assistance, as may be necessary, from other state agencies having appropriate resources and expertise.

The Ad Hoc Committee further recommends that an Advisory Committee to the Department of Transportation be set up to assist the Department in obtaining technical data, developing and evaluating other transportation-related energy conservation measures, and formulating consistent positions on the use of transportation energy. These activities would be vital inputs to the all-important program of informing the public about the energy problem and eliciting support for needed measures to mitigate its impact. This new committee could be based on the present membership of the Ad Hoc Committee, and might also be broadened to include representation from industry, railroads, automobile user groups, equipment manufacturers and primary energy suppliers.

The Ad Hoc Committee on Energy Efficiency in Transportation further recognizes that permanent staff may be required by the Department of Transportation for these continuing efforts in energy conservation. This staff, through experience gained in conservation activities, will provide valuable insights in analyzing the energy use implications of transportation projects and the development of Environmental Impact Statements relating to those projects.

# APPENDIX A1

## Committee Background

# COMMITTEE BACKGROUND

## The Interdepartmental Fuel and Energy Committee

Early in 1972 Governor Rockefeller appointed an Interdepartmental Fuel and Energy Committee to monitor, on a continuing basis, the fuel and energy resources and requirements of New York State and to recommend action to alleviate both actual and potential problems. The Committee was also directed to maintain liaison with President Nixon's Joint Board of Fuel Supply and Fuel Transportation.

The Interdepartmental Committee as originally appointed by the Governor was composed of the Commissioners of Commerce, Environmental Conservation, General Services, Local Government, and Transportation, with Public Service Commission Chairman Joseph C. Swidler serving as committee chairman. In May of 1973 the Governor added the Commissioner of Agriculture and Markets to the Interdepartmental Fuel and Energy Committee.

The first work which the committee undertook was to (1) establish a system to monitor New York State's fuel and energy resources and requirements; (2) analyze and report on the State's fuel and energy supply and demand picture for the winter of 1972-73; and (3) establish liaison with Federal agencies on fuel and energy matters. These activities are now part of both the committee's accomplishments and continuing activities.

Early in the Interdepartmental Committee's deliberations it became apparent that the nation and New York State face an energy and fuel shortage. The committee recommended to Governor Rockefeller that New York State embark upon a program of energy conservation. It was pointed out that such a program would not only stretch fuel resources and improve the reliability of fuel supplies, but also save money for consumers -- particularly in the present period of rising fuel and energy prices. An additional consideration was that energy conservation could serve to reduce the country's growing dependence on foreign fuel supplies, and thereby mitigate national security problems somewhat.

Not the least of the considerations in energy conservation is the fact that conservation can reduce the environmental burdens of producing, transporting, and consuming fuel and energy. This becomes an extremely important factor since much of the controversy over providing increased energy supplies stems from the effect upon the environment of taking such actions.

Following through on their recommendation to pursue energy conservation as a State program the Interdepartmental Committee moved to give specific content to the recommendation by approving a first phase Action Plan. This plan established three technical industry-governmental committees to identify the opportunities for energy conservation in large buildings, appliances, and transportation.

The Ad Hoc Committee on Energy Efficiency in Transportation

The three ad hoc committees were organized late in the summer of 1972. The Chairmanship of the Ad Hoc Committee on Energy Efficiency in Transportation was assigned to the Department of Transportation. Then Commissioner T. W. Parker appointed Howard B. Clarkson, Acting Director of the Department's Development Division, as chairman of the Ad Hoc Committee. The Development Division has responsibility for aviation, rail and motor carrier matters in the State's transportation program. When Raymond T. Schuler became Commissioner of Transportation on September 6, 1972, he continued Howard Clarkson's appointment as chairman of the Ad Hoc Committee.

The concept behind each ad hoc committee was to bring together representatives of governmental and non-governmental agencies concerned with the various aspects of energy conservation. In the case of the Ad Hoc Committee on Energy Efficiency in Transportation, this resulted in the following committee membership:

| | |
|---|---|
| Thomas E. Browne | - New York State Department of Public Service |
| Howard B. Clarkson, Chairman | - New York State Department of Transportation |
| William A. Craven | - New York State Department of Taxation & Finance |
| John J. Dragonetti | - New York State Department of Environmental Conservation |
| Warren H. Frank | - Central New York Regional Transportation Authority |
| William P. McGlone | - New York State Office for Local Government |
| Thomas W. O'Connor | - New York State Office of General Services |
| Arthur G. Raabe | - Metropolitan Transportation Authority |

| | |
|---|---|
| Robert J. Ringlee | - Environmental Planning Lobby |
| John B. Schnell | - American Transit Association |
| Ralph E. Schwind | - General Motors Corporation |
| Basil Y. Scott | - New York State Department of Motor Vehicles |
| William E. Seymour | - New York State Department of Commerce |
| Joseph F. Zimmerman | - New York State Joint Legislative Committee on Transportation |

## The Committee's Charge

The Ad Hoc Committee was charged with evaluating various means of increasing energy efficiency in transportation, including: (1) tax incentives or disincentives; (2) licensing; (3) horsepower limitations, and (4) mass transit. Short-term recommendations and suggested legislative action were to be reported to the Interdepartmental Fuel and Energy Committee commencing in November of 1972. Once this immediate goal was met, the Ad Hoc Committee was to identify longer range programs and report periodically to the Interdepartmental Committee. An early part of the Ad Hoc Committee's efforts were dedicated to developing a program to educate the public about the necessity for and ways of conserving energy in transportation-related activities. A more energy-efficient and less polluting transportation system was to be the ultimate goal of such actions.

## The Committee's Work Program

The Ad Hoc Committee on Energy Efficiency in Transportation first addressed conservation measures which could be implemented early, and then, secondly, turned to actions which would take longer to carry out. In the first category were those things which the State of New York could do on its own either by administrative action or by executive order of the Governor. In the second group were conservation measures which would require action on the part of the New York State Legislature, the Federal government, the private sector, or some combination of these.

In the first category four proposals were prepared and transmitted to the Interdepartmental Fuel and Energy Committee between November of 1972 and May of 1973. In addition, the Ad Hoc Committee urged favorable consideration to the concept of providing operating assistance to public transit. One proposal

in the longer range implementation category was also prepared in May, 1973. These and other recommendations concerning measures which might be employed over the long term to effectuate fuel conservation in transportation activities are contained in Section VI of this report.

It soon became apparent that the subject of energy conservation in the transportation field was vast, and that there were tremendous potentials for developing significant savings in transportation energy usage, but that there was simply not enough time or people to make a significant dent in fulfilling the charge to the Committee. Nevertheless, the Committee proceeded, operating on the philosophy that there is value in even scratching the surface. Hopefully, this start will lead to greater efforts -- and greater progress in the future.

# APPENDIX A2

## Program Proposals

NEW YORK STATE
**DEPARTMENT OF TRANSPORTATION**
Raymond T. Schuler, Commissioner

1220 Washington Avenue, State Campus, Albany, New York 12226

November 29, 1972

Honorable Joseph C. Swidler
Chairman
NYS Public Service Commission
44 Holland Avenue
Albany, New York 12208

Dear Mr. Swidler:

The Ad Hoc Committee on Energy Efficiency in Transportation is pleased to forward herewith two formal proposals for the consideration of the Governor's Interdepartmental Committee on Fuel and Energy. These constitute the results of the Ad Hoc Committee's deliberations in conformance with the assigned November deadline for recommendations on actions that might be taken in the near term to achieve better energy efficiency in transportation. As stipulated in the Interdepartmental Fuel and Energy Committee's "Action Plan," our Ad Hoc Committee will now direct its attention to the identification and consideration of longer range programs holding promise of high potential for energy conservation measures.

In transmitting these recommendations the Ad Hoc Committee is aware that they transcend the specific matter of energy efficiency in transportation. Nevertheless, in the Ad Hoc Committee's deliberations it was felt that an education program and an inventory of State government energy use were both essential aspects of an early program of conserving energy in transportation and to recommend these two actions for transportation alone would be too parochial an outlook in view of the obvious broader relationships. The Ad Hoc Committee also feels that it is important in presenting any recommendations dealing with energy conservation that the public be made aware that conservation in itself is not the solution to pending energy shortages. Other measures will be even more important if the future supply and demand are to be brought in balance.

The enclosed formal recommendations of the Ad Hoc Committee on Energy Efficiency in Transportation have been placed in a format to facilitate consideration by the Interdepartmental Committee and forwarding to the Governor if adopted. The one page summary of each proposal is a modification of the form customarily used in the Executive Chamber for placing program suggestions before the Governor while the longer attached appendix on each proposal is intended for the information of any one requiring more details on the actual program ingredients.

At the Ad Hoc Committee meeting on November 14, 1972, we discussed at some length the matter of providing government-supported operating assistance to public transportation systems providing passenger transportation services. Despite vastly improved transportation facilities as a result of recent federal, state and local capital assistance programs, these public transportation systems have continued to experience severe financial difficulties. As patronage declined, system revenues despite increased fares were incapable of meeting system operating expenses. Increasingly, government at all levels is coming to the realization that if this vitally important transportation sector is to continue to provide essential services, a program of government-supported operating assistance will be necessary. Since public transportation usually reflects more energy efficient modes of furnishing passenger transportation, the Ad Hoc Committee believes that public support for the preservation and development of strengthened public transportation systems should be encouraged. Accordingly, the Ad Hoc Committee in addition to its two formal proposals, further recommends to the Governor's Interdepartmental Fuel and Energy Committee that it take a position of public advocacy for the concept of a program of government-supported operating assistance to public transportation systems. At the present time, the Ad Hoc Committee is not prepared to endorse any specific proposals on this issue since the matter will be further examined as part of our considerations of longer range recommendations.

Sincerely yours,

H. B. Clarkson

H. B. Clarkson, Chairman
Ad Hoc Committee on
Energy Efficiency in Transportation

NEW YORK STATE
**DEPARTMENT OF TRANSPORTATION**
Raymond T. Schuler, Commissioner

1220 Washington Avenue, State Campus, Albany, New York 12226

February 20, 1973

Honorable Joseph C. Swidler
Chairman
NYS Public Service Commission
44 Holland Avenue
Albany, New York 12208

Dear Mr. Swidler:

The Ad Hoc Committee on Energy Efficiency in Transportation is pleased to transmit herewith two program proposals for the consideration of the Governor's Interdepartmental Committee on Fuel and Energy.

The first proposal for the initiation of a coordinated education program is slightly revised from the version originally forwarded to you on November 29, 1972; we have carried out the instructions received from the Interdepartmental Fuel and Energy Staff Group and have incorporated suggestions received from Mr. Stevens of the Ad Hoc Committee on Energy Efficiency in Large Buildings and Mr. Mathusa of the Ad Hoc Committee on Appliance and Apparatus Efficiency. We recognize that the first proposal goes considerably beyond the transportation concerns assigned to our Ad Hoc Committee but since it covers an element which is important to our area while also having value to the overall subject of energy conservation, it seemed worthwhile to approach the recommendation in an integrated manner. This is explained on the first Supplement page to Proposal #1 and we are glad to have the concurrence of Messrs. Mathusa and Stevens that the approach is generally acceptable to them.

Proposal #2 is a substitute for the earlier number 2 forwarded with my letter of November 29th. Acting upon the advice of the Interdepartmental Fuel and Energy Staff Group, the Ad Hoc Committee on Energy Efficiency in Transportation is reworking the ideas in the former Proposal #2 and will resubmit them in a substantially revised form in the near future. The Ad Hoc Committee is also commencing work in earnest on the longer range conservation proposals for submission later.

As explained in my November 29th transmittal, both of the enclosed proposals are packaged in a one-page summary format similar to that utilized in the Executive Chamber. The appendix to each one contains

supplementary material and details which may be of assistance to the Interdepartmental Committee when considering our recommendations, and to staff if the proposals should be implemented.

Very truly yours,

H. B. Clarkson

H. B. Clarkson, Chairman
Ad Hoc Committee on
Energy Efficiency in Transportation

# PROGRAM PROPOSAL #1

# TO THE

# GOVERNOR'S INTERDEPARTMENTAL FUEL

# AND ENERGY COMMITTEE

February 15, 1973

Ad Hoc Committee on Energy Efficiency in Transportation
New York State Department of Transportation
Albany, New York 12226

PROPOSAL:

New York State agencies to initiate a coordinated education program designed to increase the awareness of state employees and the general public on the current energy situation and what individual and collective conservation measures can be taken to alleviate anticipated shortages.

ACTION REQUIRED:

-- Governor's Interdepartmental Fuel and Energy Committee to be designated for policy direction of program with the Department of Public Service supplying staff assistance.

-- Department of Public Service take the lead in furnishing to the media and state agencies general information materials concerning the overall energy situation:

- current supply and demand
- likely future supply and demand
- promising ways of alleviating shortages.

-- State agencies repromulgate general information provided by the Department of Public Service in their internal channels with suggestions on how energy can be saved by employees in:

- their work situation
- their personal life.

-- State agencies devote a significant portion of their external public relations to information on how energy can be saved in their area of speciality.

-- Recommendations of Ad Hoc Committees on Energy Efficiency in Appliances, Large Buildings, and Transportation to be utilized in education program as they become available and as appropriate.

-- Successful results of demonstration and pilot projects by State and others to be disseminated through the program.

-- Conferences and seminars on energy conservation may be sponsored by Governor for opinion leaders and decision makers with results given wide circulation.

-- Thrust of the entire program would be to educate the public that an energy shortage is real and what they can do to conserve energy, and save money in the process.

FISCAL IMPLICATIONS:

The cost to state agencies should be minimal because the program is more a redirection of existing activities rather than new work. The Department of Public Service and one or two of the other agencies with large energy related programs would require the addition of one or more staff persons so that the program receives full time attention.

SUPPLEMENT

to

Program Proposal #1

Background

In its meeting of October 19, 1972, the Ad Hoc Committee on Energy Efficiency in Transportation turned its attention to activities which could be initiated soon and which hold promise for early implementation. Although the charge of the Committee deals exclusively with the conservation of energy in transportation, the group agreed that any campaign to bring the problem to the attention of others should be treated as part of the larger subject of husbanding all energy resources. Through an integrated effort spanning all aspects of energy conservation possible overlap could be avoided and efficiencies of scale achieved as well.

Accordingly, this program proposal has been circulated to the Chairman of the Ad Hoc Committee on Energy Efficiency in Large Buildings and the Ad Hoc Committee on Appliance and Apparatus Efficiency for their concurrence. Both chairmen agreed with the general approach but also expressed the desire that any implementation dealing with the subject areas covered by their Ad Hoc Committees be held in abeyance until after their reports are submitted.

The Approach

It was the consensus of the Ad Hoc Committee on Energy Conservation in Transportation that an appropriate place to start in any attempt to conserve energy is to first make others aware of the existing situation. It is presumed that people cannot be motivated to action unless they know that a problem exists. Only after the problem is recognized can a response be expected. Even in view of recent coverage in the news media on the subject it still must be assumed that many people in New York State are not aware that more energy shortages can be expected in the future and that unless steps are taken, the effects of the shortages could be quite severe affecting their lives both directly and indirectly.

Step one, then, is to make opinion leaders, decision-makers, and the public at large more fully aware of the present situation and the projected outlook.

Step two is to advise them what can be done about the situation so that rational individual and collective decisions can be made and, hopefully, bring about an improvement.

It must be stressed, however, that this two-step approach is not considered to be a solution to the problem. Even if conservation measures are undertaken, energy shortages are still expected to take place in the future. Hopefully, though, a conscious program of energy conservation will help some in making the problem less acute.

## The Recommendation

The Ad Hoc Committee on Energy Efficiency in Transportation recommends to its parent Committee, the Governor's Interdepartmental Fuel and Energy Committee, that it in turn recommend to the Governor that the State launch a specific program to educate consumers to be energy conscious. As mentioned above, achieving energy savings in transportation would be only one part of this program since an educational program of this nature is better achieved as one coordinated undertaking rather than separate efforts to accomplish conservation measures in building design and operation, appliance design, and transportation. When specific recommendations on the accomplishment of energy savings in buildings and appliances are forwarded by the Ad Hoc Committees dealing with these subjects, they can be incorporated as elements of the general education effort recommended here.

This educational program on the energy situation and what can be done about it should only be one of many State activities designed to bring about energy savings. The State should concurrently embark upon other efforts to conserve energy in its present activities and to seek out new conservation measures that can be held up as examples to follow. These and other recommendations dealing more specifically with achieving energy savings in transportation will be forth coming from the Ad Hoc Committee in the future.

In the meantime, a program to educate consumers to be energy conscious is a logical first step and one that can be implemented relatively easily.

## Details of the Program

To be most effective an educational program of this type should have at least a portion of the responsibility assigned to each State agency with overall direction and guidance from one centralized source. Ideally, the central direction should come from the office of the Chief Executive but the program should be equally successful if the Governor delegates the job to a line agency having good day-to-day expertise on energy matters. It is proposed that this be the Department of Public Service with the Governor's Interdepartmental Fuel and Energy Committee (with the Public Service Commission Chairman serving as its head) providing general policy guidance.

Each State agency would have an individual in a senior position (a Bureau Director as a minimum) assigned the responsibility of looking after the agency's participation in the statewide program. Usually this would be with the assistance of the agency's public relations office.

The basic ingredients of the program would be to educate both the agency's employees and its "client" group among the general public on:

(a) The energy "crisis" and the need for conservation measures; and

(b) Specific conservation measures within the area of the agency's expertise which could be utilized to effect energy savings.

For example, in the transportation field the Department of Transportation would publish articles in its employee newsletter and issue press releases with respect to the supply and demand for motor fuels. The pending "crunch" would be emphasized so that the reader is made aware that actions will be necessary to alleviate the problem. From this he should be led into a curiosity on what he can do to help. Subsequent stories would help answer the question by pointing out the gasoline savings which result from use of low-loss tires, more frequent engine tune-ups, turning off the engine in idling situations, and so on. The education effort should motivate the audience to want to do something, and then inform him of what he can do.

The above example, of course, is only illustrative and by no means should it be construed that the program would be limited only to a rash of press releases. Continuing education measures of a broader nature should be sought and are limited only by the imagination and resources of the staff people assigned to the job in each department. For instance, in the subject area of conserving energy in the field of transportation, the Department of Transportation would take the lead in originating and promulgating fuel saving ideas but other State agencies having transportation activities would also contribute to the effort. The Department of Motor Vehicles, as an example, might distribute an information bulletin on how to save fuel (and money) when it mails out its automobile registration or operator's license renewal notices. The Office of General Services has already taken steps to launch a pilot program which will measure the fuel savings and other factors involved in the use of low-loss tries and low-lead gasoline on a sample of State vehicles. Consideration might also be given to the fuel economies which would be realized in converting the State passenger fleet to compact cars.

The overall education effort of the many State departments would be bolstered by the Department of Public Service issuing status reports on the current energy supply and what the general outlook is for demand being met. They would also monitor the progress of all the State departments in carrying out the educational program and make recommendations, as appropriate, on where improvements might be made.

Supplementary Activities

Educational activities outside State government could be tried as well.

The state might sponsor a conference of the Arden House-type to enlist the support of the business community by making them full participants in the program to discover and promulgate energy conservation measures. A TV special in the national quiz format could be tried on the subject of how to conserve energy. Transit advertising might remind the rider that he is helping the energy situation by riding the more energy efficient mode. The state could proclaim Energy Conservation Week and offer a scholarship or other award for the young person submitting the best idea on the subject. Even the suggestions which do not win an award may have some "spin-off" value in follow up activities.

The possibilities are endless. The challenge is to organize most effectively to get the job done, and start doing it.

PROGRAM PROPOSAL #2

TO THE

GOVERNOR'S INTERDEPARTMENTAL FUEL

AND ENERGY COMMITTEE

February 15, 1973

Ad Hoc Committee on Energy Efficiency in Transportation
New York State Department of Transportation
Albany, New York 12226

PROPOSAL:

Office of General Services to initiate a pilot program of measuring fuel savings which might be realized through the use of low-loss (radial) tires and low-lead fuels in State vehicles. Results--if beneficial--to be promulgated to others as part of State's energy conservation program.

ACTION REQUIRED:

-- Office of General Services to take a sample of new cars from the State Garage Motor Pool and subject them to the same operating conditions except:

- some would use low-loss tires
- some would use low-lead fuel
- some would use present tires and fuels
- and some would use combinations of the above.

-- Objective of pilot program to determine which combination is the most energy efficient and what the tangible cost/benefits are, including environmental considerations.

-- If a desirable cost/benefit results, consideration to be given to converting entire State motor fleet to the most energy efficient method.

-- Dissemination of pilot program results outside State government for the use of others.

FISCAL IMPLICATIONS:

The purpose of the pilot program is to establish the cost or savings of conserving energy in the operation of State vehicles. Initial outlays to equip the sample of vehicles for the test should be about $250. Administration of the test program and analysis of the results would be performed by existing OGS staff. If the pilot program demonstrates that reduced fuel consumption can be achieved, long term financial savings in the operation of the State's motor fleet may be anticipated as long as the other cost factors don't offset the fuel savings.

Background

The report The Potential for Energy Conservation - A Staff Study (October 1972) published by the United States Office of Emergency Preparedness contains many alternative courses of action which appear to hold promise for conserving energy. In the transportation sector the use of "low-loss" (radial) tires and improved engine tuning are shown as likely to result in an annual national savings of 19 quadrillion BTU's of energy by 1975.

Informal contacts in the U. S. Department of Transportation, however, indicate that The Potential for Energy Conservation study should only be considered as containing tentative findings since its recommendations are still in the process of being evaluated. Still, it seemed to the Ad Hoc Committee on Energy Efficiency in Transportation that a start could at least be made on ascertaining the applicability of some of the possibilities for New York State. With 4,200 automobiles in the State vehicle fleet alone and another 1,700 cars assigned to the State Police the potential for realizing savings in fuel consumption is large.

At its meeting of January 16, 1973, the Ad Hoc Committee on Energy Efficiency in Transportation agreed that it would be worthwhile for the Office of General Services to determine what the costs and benefits would be if the States' fleet of passenger vehicles were switched to the use of low-loss tires and low-lead fuel. With the results of the OGS test in hand the State of New York would be in an improved position for determining which energy conservation measures may be effective in operating the motor vehicle fleet.

The Approach

If Division of Budget approval were received, the Office of General Services would replace eight field cars currently in operation with eight new cars all of the same make from the State Garage Motor Pool. The eight cars would be subdivided into four groups of two cars each. Four cars would be equipped with low-loss type tires and the other four cars would be equipped with regular original equipment tires provided by the manufacturer. These two groups would then be subdivided so that two cars would use regular gas and the other two cars would use a low-lead fuel.

Through the cooperation of Ad Hoc Committee Member Thomas W. O'Connor, Director of Centralized Services, OGS has already identified the cars of eight field persons who travel approximately 25,000 miles per year in generally the same areas of Upstate New York. This will insure that the driving conditions of the eight cars are approximately the same. The pilot group for this study are reliable field personnel who will follow the instructions for the pilot study diligently.

Quarterly reporting of mileage, gasoline consumption, repairs, and other necessary information would be maintained by Mr. Don Whalen, Chief of the OGS Bureau of Fleet Management.

The test would be conducted for a period of 30 months. The cars involved would accumulate approximately 60,000 miles which OGS believes to be the time necessary to evaluate the effect that low-lead gasoline and the tires would have on the life of the car. OGS would issue quarterly interim progress reports to the Division of the Budget in addition to the Ad Hoc Committee on Energy Conservation in Transportation and other interested parties.

The cost to the State for the test program should be minimal. The cars used would be selected from the normal inventory of cars at the State Garage Motor Pool. The only expense incurred would be the purchase of four sets of low-loss type tires which could be secured at discount from the State's present tire supply contractor. The only other possible expense would be the quarterly record keeping in the Bureau of Fleet Management. OGS feels, however, that this record keeping could be handled by the regular staff of that bureau.

The analysis of test results would not only consider the effects upon fuel consumption but also the economics of the situation when all costs are considered. One factor, for example, is the increased cost of low-loss tires and their useful life. Environmental impacts should also be considered to the maximum extent feasible.

When the pilot program is completed, the Office of General Services and the Division of the Budget will have useful information in deciding whether low-loss tires and low-lead fuel should be extended to fleet-wide use. The Ad Hoc Committee on Energy Efficiency in Transportation will be better equipped to arrive at recommendations on how energy can best be conserved in the transportation sector. Supplementary benefits can be obtained by disseminating the information obtained from the test to the general public so that they can be guided in measures which will reduce fuel consumption outside government.

Not to be forgotten is the additional benefit that New York's image will be enhanced that the State is aware of the energy shortage and is taking steps to do something about it.

The Recommendation

The Ad Hoc Committee on Energy Efficiency in Transportation recommends to its parent committee, the Governor's Interdepartmental Fuel and Energy Committee, that it endorse and support the pilot program which would be conducted by the Office of General Services as described above. The Office of General Services has already initiated discussions with the Division of the Budget to obtain approval to undertake the pilot program.

PROGRAM PROPOSAL #3

TO THE

GOVERNOR'S INTERDEPARTMENTAL FUEL

AND ENERGY COMMITTEE

March 20, 1973

Ad Hoc Committee on Energy Efficiency in Transportation
New York State Department of Transportation
Albany, New York 12226

PROPOSAL:

New York State agencies to redirect employee travel habits and patterns in order to effect an energy savings.

ACTION REQUIRED:

-- Direct all State agencies to conserve energy in employee travel and outline methods for accomplishing.

-- Agencies to report to Governor's Interdepartmental Fuel and Energy Committee by _____.

-- Report to contain specific information on measures which were employed to reduce energy use without seriously impairing service to the public.

-- Governor's Interdepartmental Fuel and Energy Committee would review agency reports and present results to agencies concerned and Governor's office.

-- Public information program to publicize programs so that objectives and results are conveyed outside government and a public awareness of problem created.

FISCAL IMPLICATIONS:

The exact fiscal implications of this program cannot be estimated until the survey is completed but the nature of the program is such that it will result in cost savings and not increases.

## The Approach

In considering actions which hold promise for yielding early results in realizing energy savings the Ad Hoc Committee on Energy Efficiency in Transportation decided to look first at activities that the New York State government could implement on its own. Later other programs which require actions by other levels of government or the private sector can be embarked upon, but because the number of parties involved is greater, it is likely that it will take much more time to accomplish visible results. Conversely, if the number of actors is small, and if they are all responsible to the same director, the likelihood of effective and early action is enhanced.

Consequently, the Ad Hoc Committee first examined those programs of energy conservation which could be carried out solely within the Executive Branch of New York State government. Next in order are those which require an act of the Legislature--either a budget appropriation or changes in the law. Last, but by no means least, because their potential for pay off is greater, are those programs which are dependent upon the Federal government and for private citizens for success.

It seemed to the Ad Hoc Committee that one thing New York State government could do at the outset was to examine itself as a consumer of energy and decide upon ways and means of reducing that consumption without adversely effecting the services provided to the public. One area that consumes roughly twenty-five percent of total energy used in the United States is transportation. Therefore, focusing attention on energy conservation measures which can be applied by New York State government to its own activities dealing with the movement of people and goods offers good potential for realizing savings in the total use of energy.

In adopting this approach the Ad Hoc Committee recognizes that conservation measures in themselves are not a solution to the energy shortages which are expected to exist in the future. At best conservation can only ameliorate the problem somewhat.

## The Recommendation

The Ad Hoc Committee on Energy Efficiency in Transportation recommends to its parent Committee, the Governor's Interdepartmental Fuel and Energy Committee, that it in turn recommend to the Governor that State agencies be instructed to redirect employee travel habits and patterns in order to effect an energy savings and report back where reductions in energy use were accomplished without seriously impairing public services. Agencies should report to the Governor. The reports should then be reviewed by the Governor's Interdepartmental Fuel and Energy Committee. The

Interdepartmental Committee would in turn prepare a coordinated and integrated conservation report and future program for consideration by the Governor.

The energy conservation program of New York State agencies should not be considered a "one shot" effort on the subject but, rather, it should be viewed as part of a continuing program complementing other governmental activities in the energy conservation field. The results of the overall program should be publicized widely in order to build the energy consciousness of the general public and set an example on what can be done to ease energy shortages.

Details of the Program

The program would be initiated by an Executive Order to State agencies instructing them to have employee travel habits and patterns realigned in order to conserve fuel usage.

Conservation measures to be outlined in the Executive Order are:

1. All state employees to utilize ground-based public transportation between cities rather than state vehicles or air travel;

2. All employees who travel regularly within a given district to perform their duties to redesign travel patterns so that travel will be minimized; and

3. All field personnel and main office employees to minimize travel by pooling travel and encouraging personnel to combine trips in behalf of others.

State agencies would be instructed to put into practice immediately those energy-saving measures which concern only their own programs and do not have an appreciable effect on their services rendered to the public. For these measures the savings in energy should be reported to the Governor and the Governor's Interdepartmental Fuel and Energy Committee.

Those energy saving measures which would affect more than one department, or which would result in a deterioration of service provided to the public, would have to be submitted for Executive approval prior to their being put into effect. One way of doing this would be for the agencies developing the proposal to submit it in the form of an analysis of alternatives with their recommendation (if any) to the Governor's Interdepartmental Fuel and Energy Committee. The staff of the Committee would then prepare an integrated Statewide program of energy conservation for the consideration of the Committee and recommendation to the Governor.

The approved Statewide program could be administered directly by the Department of Public Service if so delegated by the Governor.

Supplementary Activities

All State agencies accomplishing savings in energy use should publicize their accomplishments in order to inform their client group in the general public of what is being done. Hopefully, the dissemination of information on what the State is attempting to do will have educational vlaue in making more persons aware of impending energy shortages and what can be done about them. Even if the public is not moved to take conservation measures of their own, it will be apparent that State government is taking action.

The Governor's Interdepartmental Fuel and Energy Committee will continue to study the State's energy situation to place the energy crisis in its proper perspective and to determine the impact that energy conservation will have on the State's economy and its effect upon the consumer.

PROGRAM PROPOSAL #4

TO THE

GOVERNOR'S INTERDEPARTMENTAL FUEL

AND ENERGY COMMITTEE

March 28, 1973

Ad Hoc Committee on Energy Efficiency in Transportation
New York State Department of Transportation
Albany, New York 12226

PROPOSAL:

That the Interdepartmental Fuel and Energy Committee recommend to the Governor that the concept of high-speed rail transportation service in the Albany-New York City corridor be supported. The institution of such service initially as a demonstration project would be aimed at determining whether the provision of reliable, comfortable, high-speed rail service operating on convenient schedules would have a measurable impact upon the travel market in this corridor and whether the possible diversion of travellers to this new and improved service could contribute significantly to the potential for energy conservation here and elsewhere in New York State.

ACTION REQUIRED:

-- Legislature to approve funds for contracting for or actual operation of high-speed rail service in the Albany-New York City corridor.

FISCAL IMPLICATIONS:

Present estimate for the institution of this type of service is envisioned at approximately $38 million which includes the purchase of required high-speed train sets, track rehabilitation and signalization work. Operational, capital and maintenance costs are included in this estimate. Though not included in the estimate, the possibility of Federal support for such a project will be investigated and if available, would permit a more frequent level of service and the implementation of the project within a shortened time frame.

## The Approach

The Ad Hoc Committee first examined programs of energy conservation which could be carried out solely within the Executive Branch of New York State Government. Three proposals within this limitation have been submitted for consideration. Next in order came those which require an act of the Legislature -- either a budget appropriation or changes in the law. This proposal would require a budget appropriation. Last, because their potential for payoff is greater, are those programs which are dependent upon the Federal government and private citizens for success.

Transportation consumes roughly twenty-five percent of the total energy used in the United States. Of the total amount consumed for transportation, approximately 65% is consumed by automobile travel. Thus, conservation of gasoline used in automobiles could have a significant impact upon the total fuel situation.

The education program outlined in this Ad Hoc Committee's Program Proposal #1, as well as the pilot program for use of low-loss radial tires suggested in Program Proposal #2 are methods by which the fuel shortage could be ameliorated by conserving gasoline used in automobile travel. This proposal to re-orient travel habits from the automobile to more energy-efficient means of travel, in this case a high-speed rail system, is also directed at the conservation of gasoline.

## The Recommendation

The Ad Hoc Committee on Energy Efficiency in Transportation recommends to its parent committee, the Governor's Interdepartmental Fuel and Energy Committee, that it in turn recommend to the Governor and the Legislature that a high-speed rail transportation system be instituted in the Albany-New York City Corridor, and that the necessary funding for this program be approved.

This recommendation is based upon the study completed in 1969 by the State Department of Transportation, High-Speed Rail Service in New York State which supplied the data basic to the following analysis.

### Background:

It has long been argued that one of the chief reasons that Americans have become so enamored of the private automobile is that public transportation has utterly failed to provide the kind of transportation that we demand. This charge has been particularly prevalent with regard to the passenger railroads. They have been accused of providing infrequent, inconvenient, unreliable and uncomfortable service. In the difficult financial situation of the past several years, the railroads exhibited little interest in

upgrading their passenger services with the result that former patrons abandoned the railroads for their automobiles or other modes of travel. Yet a federal project in the Washington-New York City corridor has demonstrated that a high-speed, quality rail service can retain and even win back significant numbers of former patrons.

Obviously there are many new transportation technologies that have been proposed and that are being developed which may in the longer range offer significantly greater potential for energy conservation than this proposal presently envisions. Few of these advanced technologies have advanced beyond a prototype stage for testing and none has yet reached the systems operations stage. This proposal, however, comprehends a project that is achieveable in the short range within the current state-of-the-art using available equipment, existing rights-of-way and track structures and an available operating organization.

While the provision of better transportation service as proposed in this project is in itself a desirable objective, it is the potential for increased acceptance of more energy efficient modes of travel and the lessons to be learned in how to generate that acceptance that is of present interest to this Ad Hoc Committee.

As a general rule it is more efficient with respect to the utilization of energy to transport people by rail rather than by private automobile. Automobile fuel consumption in 1970 averaged 13.6 miles per gallon. With an average occupancy rate of 1.9 persons per vehicle, this means that a gallon of gasoline is able to accomplish about twenty-five passenger miles. If six people occupy the car, of course, better than eighty passenger miles can be accomplished with one gallon of gasoline.

Utilizing the rail mode a significant increase in the number of passenger miles can be realized. The experience of United Aircraft TurboTrains on the Canadian Toronto-to-Montreal run shows that a seven-car train capable of carrying approximately 350 passengers consumes 2.55 gallons of #2 diesel fuel per mile. Assuming average load conditions in both modes (e.g., 250 passengers per train and 1.9 passenger per automobile), the energy efficiency of TurboTrains for carrying passengers is approximately four times that of automobiles.

The Ad Hoc Committee on Energy Efficiency in Transportation thinks that it is worth exploiting this natural energy efficiency of passenger trains in achieving energy conservation in New York State.

The State Department of Transportation's concept study, <u>High Speed Rail Service in New York State</u>, indicated that (page 18)

"significant improvements in the speed and ridership levels of the major rail corridors of the State are possible". Paramount amoung these is the Albany to New York City corridor where a 1973 re-examination of the earlier study concluded that a total of 1,800,000 one-way passengers is a reasonable expectation of annual ridership in the New York City to Albany corridor if a modern high-speed (up to 120 mph) service is installed which would result in a trip time of one hour and forty-five minutes.

Taking the figures from the High Speed Rail Service in New York State Concept Study (page 13) it was estimated that 551,000 trips in the New York City to Albany corridor in 1968 would be diverted from other transport modes, except bus. These trips could be expected to consume 2,253,000 gallons of gasoline if they all occurred by automobile with 1.9 persons per car obtaining 13.6 miles per gallon. Conversely, these 551,000 trips taken on high-speed TurboTrains (figuring 250 passengers per train using 2.55 gallons per mile) would utilize 1,322,000 gallons of fuel. Therefore, on an annual basis an estimated 931,000 gallons of fuel could be saved by installing and marketing, high-speed rail service in the Albany to New York City corridor. (Note: Not all trips are expected or considered to extend the entire length of the Albany-New York City corridor.)

Details of the Program

The precise details of the proposed system are not of immediate concern to the Ad Hoc Committee, but the fact that such a high-speed rail system could conceivably conserve one million gallons of fuel on an annual basis is of significance when the possibility of extending similar service in other corridors is considered. Should this demonstration, in fact, prove successful in diverting large numbers of persons to rail transportation, this improved service may prove feasible in the Albany-Buffalo, Albany-Montreal, or Albany-Boston corridors. The amount of fuel which might be conserved by these systems was not determined in this study.

Whether the service suggested is obtained under a contract with the National Railroad Passenger Corporation (Amtrak) or from operation of the system by a State agency is also not pertinent to the concerns of this Committee. This Ad Hoc Committee recommends that the Interdepartmental Fuel and Energy Committee, acting within its broad concerns for the implementation of energy conservation measures, recommend to the Governor that the concept of high-speed rail transportation service in the Albany-New York City corridor be supported.

PROGRAM PROPOSAL #5

TO THE

GOVERNOR'S INTERDEPARTMENTAL FUEL

AND ENERGY COMMITTEE

May 9, 1973

Ad Hoc Committee on Energy Efficiency in Transportation
New York State Department of Transportation
Albany, New York 12226

PROPOSAL:

Office of General Services to establish a closed-circuit telecommunications system between Albany and New York City as a one-year pilot program to conserve energy by reducing the number of passenger automobile trips between these cities and as a test to measure the potential for such systems in reducing travel demands on a statewide basis.

ACTION REQUIRED:

-- Office of General Services to select appropriate locations in Albany and in New York City for closed-circuit telecommunications studios.

-- Purchase (or lease) necessary equipment and furnishings to provide appropriate facilities for television transmission and reception.

-- To lease circuitry to permit two-way audio and video communications between the studios.

-- To agressively promote the use of this service among State agencies, emphasizing the possibilities of saving travel expense and time and reducing gasoline consumption.

FISCAL IMPLICATIONS:

Present estimates indicate the cost of furnishing and equipping the two studios will approximate $20,000 for the two locations. A two-way video channel leased from the major company will cost approximately $13,000 per month.

## The Approach

The Ad Hoc Committee first examined programs of energy conservation which could be carried out solely within the Executive Branch of New York State Government. Three proposals within this limitation have been submitted for consideration. Next in order came those which require an act of the Legislature -- either a budget appropriation or changes in the law. One proposal requiring a budget appropriation has already been submitted for consideration. This proposal would also require a budget appropriation. Last, because their potential for payoff is greater, are those programs which are dependent upon the Federal government and private citizens for success. These programs will be developed in the Ad Hoc Committee's final report.

Since automobile travel consumes nearly 65% of all energy in transportation the Ad Hoc Committee's proposals have been directed at conserving the use of gasoline in these vehicles. This program, designed to eliminate the need for numerous automobile trips between Albany and New York City is also directed at this major consumer of fuel.

## The Recommendation

The Ad Hoc Committee on Energy Efficiency in Transportation recommends to its parent committee, the Governor's Interdepartmental Fuel and Energy Committee, that a closed-circuit television system be established between Albany and New York City as a one-year pilot program. It is expected to reduce the number of passenger automobile trips between these cities and effect a fuel savings as well as efficiencies in State employee time use. The Committee recommends that necessary funding for this project be made available.

## Background

A sub-group of the Ad Hoc Committee recently observed an actual meeting which utilized existing telecommunications facilities owned by the Telephone Company. Telephone Company officials in New York City and Office of General Services personnel in Albany conducted a one half-hour meeting for purposes of discussing and resolving questions relating to telephone facilities in a new State Office Building in New York City. At any one time three principals at each location were "on camera" and were able to hold open and free flowing discussion with the same facility as if all participants were in the same room. Other resource persons and participants were seated behind the principals and were also able to be seen on screen and offer comments.

As the meeting progressed, the cast of principals changed with ease when special resource persons moved to the "on camera" table to present plans and data. The meeting lasted approximately one half-hour and adhered strictly to prepared adgenda. This meeting thus eliminated the need for travel to New York City on the part of at least four state employees. While savings in energy through the elimination of travel could be significant, the efficiencies to be realized in the effective utilization of state personnel could be even more significant.

At the present time approximately 70 State-owned "pool" automobiles are dispatched each month (for less than 48 hours each) for travel between Albany and New York City. An additional number of vehicles in excess of 150 per month are dispatched for time periods in excess of 48 hours.

While these estimated 150 round trips between Albany and New York City quite obviously compose the major portion of the automobile travel, the apparent reasons for using personal trips preclude the use of telecommunications in a large percentage of those instances.

One effect of a telecommunications system on gasoline consumption, then would be reflected in the elimination of those 70 round-trips per month between Albany and New York City. These trips alone consume over 19,000 gallons of fuel per year. If only one-half of the extended uses of pool vehicles were eliminated by the availability of the system, an additional 20,000 gallons of gasoline would be conserved.

The use of the proposed telecommunications network, however, would not be limited to those State employees using "pool" cars. Employees using personally-assigned cars, personal vehicles, and State legislators would also have access to this facility. The gasoline which would be conserved by eliminating a large portion of the Albany-New York City travel presently undertaken by these groups is estimated to equal or exceed that which would be conserved among the "pool" car users.

The 100,000 gallons of gasoline which could be conserved by use of a telecommunications network between Albany and New York City, while not significant in itself, is significant as a by-product of the savings and efficiencies which would result to the State agencies using the system. Rather than six hours travel time, plus expenses, being incurred for a two-hour meeting, now such a meeting could be handled with minimum travel time and expense via the telecommunications network. Planning for these meetings would also increase their efficiency and produce better results. The quantification of these savings, of course, is a difficult if not impossible task which was not undertaken as

part of this recommendation. The savings and benefits, however, are felt to be significant enough to warrant a demonstration of the proposed system.

Details of the Program

The detailed arrangements for the program, such as site location, system selection, and staffing are proposed to be handled by the State Office of General Services as part of their present duties in the communication and travel field.

# APPENDIX A3

## Estimates of Fuel Saved

CALCULATION OF TRANSPORTATION FUEL USED IN NYS

Source:

Data supplied by Thomas Browne, NYS Department of Public Service, Office of Economic Research, citing Consumption of Energy in New York State: 1971, O.E.R. 15, (26 February 1973), pages 4, 5.

Conversion factor:

"Based on these [approximate] figures, one quadrillion BTU/yr is equivalent to 470,000 barrels/day of oil." Source: Office of Emergency Preparedness, Executive Office of the President, The Potential for Energy Conservation; A Staff Study (Washington: Government Printing Office, 1972 [?]), page 1, n. 1.

"Sources of Energy Input to the Transportation Sector: New York State, 1971"

| | Trillion BTU | Assumed* use inside NYS | Trillion BTU | 1,000 bbl/day | | Approximate use by "modes" inside NYS |
|---|---|---|---|---|---|---|
| Gasoline | 822.7 | | | | | |
| Motor | 728.8 | 100% = | 729 | 340 | 290 | Autos |
| | | | | | 50 | Light Truck |
| Aviation | 93.9 | 50% = | 47 | 22 | 22 | Comm. Aircraft |
| Jet Fuel | 183.3 | 10% = | 18 | 8.5 | 9 | Comm. Aircraft |
| Residual Oil | 114.6 | 10% = | 12 | 5.5 | 6 | Vessels |
| Diesel Oil | 52.2 | 100% = | 52 | 24 | 15 | Truck and bus |
| | | | | | 9 | Railroad |
| Electric | 32.4 | 100% = | | 15 | 15 | Railroad |
| LPG | 1.3 | | 1 | | | |
| TOTAL | 1,206.6 | | 859 | | | |

* Thomas Browne observes, "Gasoline dominates the transportation sector, accounting for almost 70 per cent of energy sold...in New York State. The role of...jet fuel and residual oil is overstated. ['Almost 90 per cent of domestic jet fuel loaded on jets was put on aircrafts in the two large New York City metro airports... Most of the fuel...leaving these two airports is consumed outside the State.'] As a result, gasoline probably accounts for at least 80 per cent of the energy consumed, as opposed to sold, within the State by the transportation sector."

CALCULATION OF FUEL SAVED BY HAVING MORE SMALL AUTOS

Sources:

Letter from Basil Y. Scott, DMV, to AHC EET on "Passenger Vehicle Weights" (20 February 1973).

Liston, L.L. and C.L. Gauthier, Cost of Operating an Automobile, Federal Highway Administration, U.S. Department of Transportation (Washington: Government Printing Office, 1972).

Calculations

1971 Distribution NYS Passenger Vehicle Weights

| Name | Wt. Class | Number (1000's) | FHWA "suburban" mileage (mi/gal) | Assumed mileage (mi/gal) | Ann. fuel (10,000 mi), gal | Total fuel (million gal) |
|---|---|---|---|---|---|---|
| Sub-Comp. | 1000-2499 | 778 | 21.43 | 22 | 455 | 343 |
| Compact | 2500-3249 | 1,541 | 15.97 | 16 | 625 | 963 |
| Intermed. | 3250-3749 | 1,637 | | 15 | 670 | 1,097 |
| Standard | 3750-5249 | 2,106 | 13.6 | 13 | 770 | 1,622 |
| Special | Over 5249 | 6 | | 9 | 1,110 | 7 |
| | | 6,068 | | | | 4,032 |

Check: Derived 4,032 $\bar{M}$gal/yr would be 96 $\bar{M}$bbl/yr, or 263,000 bbl/day, which checks reasonable well with the 290,000 bbl/day calculated from PSC data.

Fuel Consumption Calculated from DMV Projected Auto Population

| | 1975 | | | 1980 | | |
|---|---|---|---|---|---|---|
| | K veh | gal/yr | $\bar{M}$gal/yr | K veh | gal/yr | $\bar{M}$gal/yr |
| Sub-Comp | 940 | 455 | 428 | 1,150 | 455 | 523 |
| Compact | 1,500 | 625 | 938 | 1,450 | 625 | 906 |
| Intermed. | 1,900 | 670 | 1,273 | 2,250 | 670 | 1,508 |
| Standard | 2,350 | 770 | 1,810 | 2,650 | 770 | 2,040 |
| Special | 7 | 1,110 | 8 | 8 | 1,110 | 9 |
| | | | 4,457 | | | 4,986 $\bar{M}$gal/yr |

CALCULATION OF FUEL SAVED BY HAVING MORE SMALL AUTOS (cont'd.)

Fuel Consumption Calculation from Arbitrary "AHC" Projections

| | | 1975 "Low" | | 1980 "Low" | | 1980 "High" | |
|---|---|---|---|---|---|---|---|
| Size | gal/yr | Assumed Split | Mgal | Assumed Split | Mgal | Assumed Split | Mgal |
| Sub-Comp. | 455 | 20% | 609 | 30% | 1,024 | 35% | 1,194 |
| Comp. | 625 | 25% | 1,045 | 20% | 937 | 25% | 1,172 |
| Intermed. | 670 | 25% | 1,120 | 25% | 1,256 | 25% | 1,256 |
| Standard | 770 | 30% | 1,545 | 25% | 1,444 | 15% | 866 |
| Special | | | 8 | | 9 | | 9 |
| | | | 4,327 Mgal/yr | | 4,670 Mgal/yr | | 4,497 |

Possible Fuel Savings

| | 1975 | 1980 | | 1980 | |
|---|---|---|---|---|---|
| As calculated for DMV projections. | 4,457 | 4,986 | | 4,986 | |
| If per AHC "split" instead | 4,327 | 4,670 | Low | 4,497 | High |
| Fuel saved by lighter autos (Mgal/yr) | 130 | 316 | | 489 | |

FUEL SAVED BY RADIAL TIRES

Source:

Automotive Industries (1 August 1972) attributes to Wayne Anderson, U.S. Army Tank-Automotive Command, "...feels that radial tires -- with a potential 10% fuel savings -- could be one of the most effective ways of reducing fuel consumption..." [page 34].

Calculation

Radial-ply tires have been said to save up to 5% or 10% energy in highway travel. As they wouldn't affect braking energy losses in urban driving, may assume they would yield an average 3% saving.

Consumption of gasoline by autos and light trucks is 340,000 bbl/day (or 124 Mbbl/yr), x 42 gal/bbl = 5,200 Mgal/yr in NYS. And 3% of that would be 156 Mgal/yr saved, potentially.

Assuming that 20% additional vehicles could be induced to change to radial tires by a tire tax on other means, fuel saved is some 30 Mgal/yr in NYS.

FUEL POSSIBLY SAVED BY AIR CONDITIONER TAX

Source:

Keith Doig, "Transportation Energy for the Future: A Close Look at Motor Gasoline Demand" (prepared by Shell Oil Company for presentation at the Georgia Tech Energy Symposium, Atlanta, Georgia, 6-7 April 1972), page 5, states "It is estimated that car air conditioners, when used, impose a 10% fuel penalty... We forecast that 70% of new cars will be air conditioned by 1981..."

Assumptions

(Probably overestimates A/C fuel consumption).

Assume air conditioning adds a 15% fuel penalty while in use, which might be during 75% of travel for an assumed 2 1/2 months (July, August and half of September).

Assume average mileage is 13.3 mi/gal; also, that 67% of the auto and light-truck population will have been equipped with A/C.

Calculations

The assumed 15% fuel penalty on 13.3 mi/gal (or 0.075 gal/mi) would be equivalent to about 0.011 gal/mi for A/C running.

The assumed utilization of 75% of travel during 2 1/2 months would be (77 days) x 75% ÷ 356 da/yr = 16% of year's travel.

Applied to annual gasoline consumption of 5,200 $\overline{M}$gal/yr, get 16% x 5,200 x (15% fuel penalty) x (67% veh A/C) = 83 $\overline{M}$gal/yr for A/C.

Check Total 1972 NYS vehicle miles of travel is 75,000 $\overline{M}$ VMT [source: HPR, Chapter 9, Table TA-1]. Apply the equivalent A/C penalty of 0.011 gal/mi to 16% of annual travel of 67% of the vehicles.

0.011 x 16% x 75,000 $\overline{M}$ VMT x 67% = 88 $\overline{M}$gal/yr, which checks well with the above estimate of A/C fuel.

Impact of Tax

Can only suppose the enactment of a tax that would be no higher than would discourage possession of automotive air conditioners by 10%. Thus that would save some 8 $\overline{M}$gal/yr of fuel.

FUEL SAVED BY IMPROVED TRAFFIC FLOW

Sources:

Informal conversations with R.E. Frank and D. H. Bulman, New York State Department of Transportation, Bureau of Traffic Engineering and Control.

Paul J. Claffey, Running Costs of Motor Vehicles as Affected by Road Design and Traffic (NCHRP Report 111. Washington: Highway Research Board, 1971), page 18, 26, and 28.

Rationale

What would be the potential savings from better traffic signs, and especially, better signal controllers?

It is known that the metropolitan auto typically travels about 20 miles daily. Now suppose that in that much travel, two stops per day were saved for every vehicle by the more general installation of traffic-actuated controllers for traffic signals.

> R. E. Frank believes this possible if extended to municipal signals. D. H. Bulman stresses that TOPICS (Traffic Operations Program to Increase Capacity and Safety) efforts will lessen speed-change "turbulence", and believes the 2 stop/day saving conservative if they get the approximately $40 million needed for computerized installation in six upstate cities.

So 2 stop/day saved seems a fair starting point.

Calculation of Fuel Saved

Claffey (Tab. 7, page 18) shows that an auto in a stop-start cycle, with 30-second dwell, from a 30 mph speed uses about 0.01 gallons extra.

For general traffic stream at 30 mph, a stop and 30-second dwell might consume fuel as calculated:

| | | | |
|---|---|---|---|
| 90% autos | x | 0.01 gal. | Approximately 0.0125 gallons lost per vehicle at an urban stop. |
| 8% trucks | x | 0.02 gal. | |
| 2% semi-trailers | x | 0.09 gal. | |

For 340 weekday-equivalents/yr and 95% of vehicles in use on any day, annual average fuel loss is about:

340 "day" x 95% x 0.0125 gal x 2 stops/day = 8 gal/veh/yr

So statewide saving for 7.5 million motor vehicles: 60 $\overline{M}$gal/yr saved.

ESTIMATED FUEL SAVED BY COMMUTER AUTO POOLS IN NYS

Sources:

"Car Pools to Travel Free on San Francisco Bridge", New York Times, (28 November 1971), Sect. 5.

"Easing the Commuter Crush", Passenger Transport, (24 December 1971), page 1, 6.

Background

By all indications purely voluntary pooling has low appeal. For example, from the above sources it appears that on the congested San Francisco-Oakland Bay Bridge the double inducements of a toll-free and express lane for autos with at least three occupants produced about 1,000 such "pools" -- about double the number under previously more congested conditions -- but only about 4% (or 1,000/25,000) of the total volume of autos.

It is reported that before the introduction of staggered shifts at the State Office Campus in Albany, officially "brokered" pools had involved only about 2 1/2% of the employees there.

Analysis of Occupancy

In very simplistic terms if the probability of two individuals pooling is p, then the probability of three persons forming a pool has a much smaller value of roughly $p^2$. On this basis it would be generous to assume a 3:1 ratio between two-member and three-member pools.

It seems fair to assume that, under "ordinary" conditions (ample parking, tolerable traffic), a voluntary pool-arranging program might affect an additional four autos per 100 drive-alone commuters. A 3:1 ratio of two-member to three-member pools may be assumed. Then the resulting conversion of 100 current drive-alones may be interpreted:

| 100 drivers | = | 91 alone | + | (3) 2-member pools | + | (1) 3-member pool |
|---|---|---|---|---|---|---|

| 100 autos | = | 91 autos | + | 3 autos (6 p) | + | 1 auto (3 p) | + | 5 autos not used |
|---|---|---|---|---|---|---|---|---|

These assumptions show an additional 9% (or 9 persons per 100) enlisted in pools, and a saving of 5 autos per 100.

ESTIMATED FUEL SAVED BY COMMUTER AUTO POOLS IN NYS (cont'd)

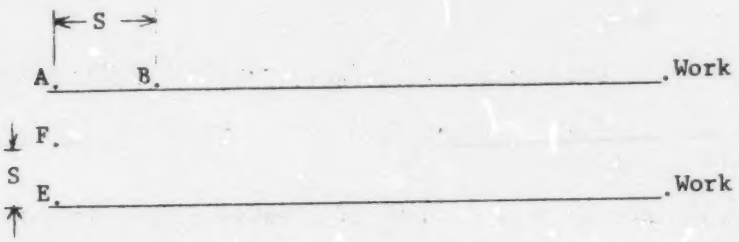
Analysis of Travel

How much P and D (pick-up and delivery) travel is added?

Consider two P and D examples, where "S" is the average inter-home spacing.

In upper diagram, when A drives there is no wasted travel; but B must backtrack a distance "S" to pick up A, and travel "S" again to pass his own home -- and reverse that at night, for a total of 4S.

This averages, for A and B, 2S of P and D travel daily.




In the lower diagram, either E or F must travel "S" in morning to pick up the other, plus "S" after work to deliver.

Therefore, we may consider the P and D travel added to be 2 x (inter-home spacing).

As to inter-home spacing distance, some poolers may drive to other's home and park there, while many poolers probably don't travel far on P and D (as that would inhibit formation of the pool), so assume "S" is only one-half mile.

Therefore, P and D for the riding member is assumed to be 1 VMT/day.

"Mainline" Distance to Work

At distances of 25 or 30 miles the incentive for pooling may be strong, but few workers travel so far; at up to 5 miles there are more workers with common schedules and destinations, but only a weak incentive.

So in the absence of any data at hand, may assume a one-way travel distance of 10 miles.

Calculation of Fuel Saved

Use example of 100 driven-alone autos going 10 miles to work and same distance back; that amounts to 2,000 VMT each work day.

Now, introduction of 4 pooling autos (from analysis above) results in P and D for 3 persons in the three 2-member pools, and 2 persons in a single 3-member pool, for a total of 5 P and D's twice daily. The daily added P and D travel is then 5 VMT/day.

ESTIMATED FUEL SAVED BY COMMUTER AUTO POOLS IN NYS (cont'd)

Meanwhile the remaining 95 drive-alone autos continue to travel
95 x (10 + 10) = 1,900 VMT/day.

Net saving is now 2,000 - (1,900 + 5) = 95 VMT/day per 100 drive-alone autos, or some 0.95 VMT/day for the "average" drive-alone commuter.

The 1970 Census indicates 2.6 million commuters drive alone in NYS. Allowing for "impossible" work situations, suppose that the potential drive-alone candidates amounted to 2 million.

Then the fuel saved would be:

2 million (0.95 VMT) = 1.9 VMT/day ÷ 13.3 mi/gal (say) = 140,000 gal/day.

And maximum possible fuel saving resulting from a 9% additional enlistment in auto pools would be:

250 work day/yr x 140,000 gal/day = 35 $\bar{M}$gal/yr maximum fuel saving

CALCULATION OF FUEL SAVED BY ENGINE TUNE-UPS

Assumed

A 2% improvement in mileage, on the average, is assumed for engines re-tuned reasonably often.

Also, it is assumed that NYS emissions testing will force 20% of all autos and (gasolined-powered) trucks to have engines re-tuned when they otherwise wouldn't have.

Calculation

NYS motor gasoline consumption of 340,000 bbl/day, is equivalent to 5,200 $\bar{M}$gal/yr.

So, 20% of vehicles x 2% less fuel x 5,200 = 20 $\bar{M}$gal/yr saved.

CALCULATION OF SAVINGS FROM AVIATION TAX

Rationale

Aviation is a substantial, and not "efficient", user of petrofuel. Yet no significant tax could be imposed on aviation fuel or on aircraft registrations by NYS, for obvious reasons (evasion).

It might, however, be feasible for NYS to impose a substantial tax on all aircraft landings -- basically, a statewide surcharge landing fee -- inasmuch as the value-of-time motivation for air travel also makes it quite inelastic as to place. (Someone flying to Binghamton would hardly be willing to land at Wilkes-Barre instead, to save a few dollars.) Of course, the presence of Newark among the three Port Authority airports would surely deter imposition of a severe fee for discouraging unnecessary or lightly-loaded flights.

Aviation Fuel Use

[In page 18] it was estimated that "commercial aircraft" consume, within NYS, some 22,000 bbl/day gasoline + 9,000 bbl/day jet fuel. That is 31,000 bbl/day x 42 gal/bbl = 1.3 Mgal/day = 470 Mgal/yr.

Calculated Effect

Now assume that a heavy (but weight-related) landing fee -- perhaps adding $3 to the air fare or $30 to landing fee for a corporate jet -- would actually reduce air travel by 1%.

Then the fuel saved in NYS would amount to 1% of 470 Mgal/yr, or say 4 Mgal/yr.

Note: This is effective only if it actually dissuades flying, or converts the travel to much more energy-efficient modes such as intercity bus. To allow for net saving over mode-converted travel, the effect is taken as 4 Mgal/yr.

# APPENDIX A4

## Education for Change

# EDUCATION FOR CHANGE

(prepared by Robert J. Ringlee*, June 1973)

## Introduction

An analysis of the end use of energy in the U. S. in 1970 reveals that 85% is represented by personal consumption while the remainder is made up of exports and end uses by the states and federal government. Personal consumption expenditures include fuels for such uses as private cars, home heating and air conditioning, and electric appliances.[1]

Gasoline and oil represent more than half of the energy source. Furthermore, the rate of increase of per capita consumption of gasoline and oil has been rising at a rate close to 4½% per year for the ten year period 1960-1970. A significant fraction of this gas and oil consumption is for private automobiles.

The tastes, habits, and aspirations of the American public have been of direct influence upon the rate of increase of fuels consumed for transportation. The "solid gold cadillac" and other heavy cars have been the symbols of affluence. Even in given lines of cars there have been increasing weight trends with corresponding declines in transportation efficiency (the Chevrolet Impala has increased in weight from 4,000 lbs. in 1958 designs to 5,500 lbs. in 1973). The gas mileage in Impalas has declined correspondingly from 12.1 mpg down to 8.5 mpg.[2]

Until recently there has been little regard for the problem posed by the rate of energy consumption. "Americans tend to ignore trade-offs between fuel consumption and speed, convenience, safety, and comfort of transportation."[1] The trend toward more powerful, larger cars and more cars per family has been persistent.

This is not to say that the alternatives have not been available to the buyer, cars of many designs and efficiencies have been offered. For example, "Today's car buyer has available a choice of vehicles in terms of the size and weight, engine type, and convenience devices. These choices can influence a vehicle's fuel economy over a range of 4 to 1."[2] This comparison was based upon car inertia weights in the range 2,000 lbs. to 5,500 lbs.

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The significance of the influence of car weight is well illustrated in the example cited by the Environmental Protection Agency: "If the average car weighed 2,500 lbs. instead of 3,500, the nation would save 2.1 million bbl of crude oil a day -- more than the proposed Alaska pipe line would deliver."[3]

More over, Federal subsidies have tended to favor both automobile and air transportation development as well as truck movement of freight. Continuation of these policies will maintain the high rate of growth of these modes of transportation.

On a broader scale, the rate of growth of vehicles in the world, 6.8% per year, exceeds by far the rate of growth in the U. S., 4.0%.[4] Hence, the growing world-wide competition for petroleum products foreshortens the time available to institute changes in consumption patterns.

An accurately informed public is an essential requirement to effectively institute changes in consumption of non-renewable resources such as petroleum. It's timely to begin a coordinated program to increase public awareness of the shortcomings of the present public attitude toward lavish use of fuels.

Public support is essential to carry out needed changes in laws affecting taxation and subsidies relating transportation and fuels. Public understanding is vital to effect changes in per capita consumption of fuels. Finally, public understanding and support will be necessary to carry out capital programs to improve transportation efficiency and to provide more efficient transportation alternatives to the present, relatively inefficient private auto and jet aircraft modes.

Such a program should approach the idea of the need for voluntary actions by the public to reduce fuel consumption coupled with the warning that rationing and shortages will result if the rate of growth of fuel consumption isn't cut.

Educational Program

A twofold program is proposed to educate New York State citizens to the significance of the fuel shortage and the actions that each citizen can take to alleviate or at least forestall the possible shortage. The first part of this proposal involves a coordinated program among New York State agencies.

PROPOSAL A

New York State agencies to initiate a coordinated education program designed to increase the awareness of state employees and the general public on the current energy situation and what individual and collective conservation measures can be taken to alleviate anticipated shortages. Public interest groups, environmentalist and conservationist organizations, as well as automobile and petroleum industry representative's cooperation will be solicited in the preparation of a plan of public education.

Action Required:

-- Governor's Interdepartmental Fuel and Energy Committee to be designated for policy direction of program with the Department of Public Service supplying staff assistance.

-- Department of Public Service take the lead in furnishing to the media and state agencies general information materials concerning the overall energy situation:
  - current supply and demand
  - likely future supply and demand
  - promising ways of alleviating shortages.

-- State agencies promulgate general information provided by the Department of Public Service in their internal channels with suggestions on how energy can be saved by employees in:
  - their work situation
  - their personal life.

-- State agencies devote a significant portion of their external public relations to information on how energy can be saved in their area of specialty.

-- Recommendations of Ad Hoc Committees on Energy Efficiency in Appliances, Large Buildings, and Transportation to be utilized in education program as they become available and as appropriate.

-- Successful results of demonstration and pilot projects by State and others to be disseminated through the program.

-- Conferences and seminars on energy conservation may be sponsored by Governor for opinion leaders and decision makers with results given wide circulation.

-- Thrust of the entire program would be to educate the public that an energy shortage is real and that through each person's efforts, energy can be conserved and money saved in the process. Energy conservation will help in the nation's balance of payments. Energy conservation will aid by reducing the nation's dependence upon foreign fuel reserves.

PROPOSAL B

The Education Department and the Department of Environmental Conservation jointly prepare curriculum resource material and a curriculum outline on topics of fuel and energy conservation. The material would be designed for use by public school systems in the elementary and high school programs; topics should develop the limitations of the reserves of fuels and the wise use of non-renewable resources. Fuel saving alternatives that individuals can achieve through their choices and actions should receive primary attention.

Public school systems, through their role in shaping public ethics, should be given the opportunity to help in the change of public attitudes towards resource uses. Accordingly, it is suggested that the current Education Department curricula, as well as projected legislative actions regarding environmental and conservation education, be modified to include topics on resources and information on the subject of individual and public action to be taken to conserve non-renewable resources presently used as fuel for transportation. There would appear to be several existing curricula which might be modified to accommodate such a goal. For example, units in driver education, general and life sciences, and social studies, particularly social studies at the 12th grade level, would seem to be able to accommodate discussions of the broader problems of fuel conservation, energy problems, and life styles in these United States.

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